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PRO  
MAYA  
CONCEPTS  
RENDER IN  
MODO

Experiment with colour and learn  
to work from 2D illustrations

TIGHTEN  
UP YOUR  
SCULPTS  
PAGE 24

## MODEL WITH IMPACT IN ZBRUSH

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“After I finished the initial block out, I imported the orc into ZBrush and started sculpting the primary shape of the face”

**Reza Abedi**  
reveals how he  
created his  
stunning orc  
render **Page 26**

**Tighten up  
your ZBrush  
sculpts  
Page 24**



**Reza Abedi**  
[rezaabedi.artstation.com](http://rezaabedi.artstation.com)

**Software** ZBrush, 3ds Max,  
Substance Painter





MPC shows off its best assets **Page 32**

# Welcome



Where does the time go? ZBrush 4R7 is now over 18 months old, and in that time the community has wholly embraced the new tools that Pixologic squeezed in there like ZModeler, NanoMesh, ArrayMesh and the ZBrush to KeyShot Bridge. The release of 4R7 took ZBrush from being a superb sculpting solution to being the ultimate tool for modellers.

Now, of course, we're all (kind of) patiently waiting for any whisper of ZBrush 5. Pixologic is fairly secretive about these things and isn't a company to adhere to regular, yearly releases, so we'll leave a big question

mark next to that one for now. Perhaps when January rolls around and 4R7 hits the two-year mark we might hear some rumblings coming out of Los Angeles, but for now, there are plenty of exciting features for you to explore in the current release.

Whether you're new to ZBrush, or it's your bread and butter, our cover feature will guide you through five interesting projects in different, distinctive styles that will help you to enhance your own work today. As well as another incredible array of tutorials, we've also been lucky enough to chat to MPC about its incredible asset pipeline this month and Blender fans can get stuck into an awesome papercraft animation project. Enjoy!

**Steve Holmes**, Editor

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# 3DArtist

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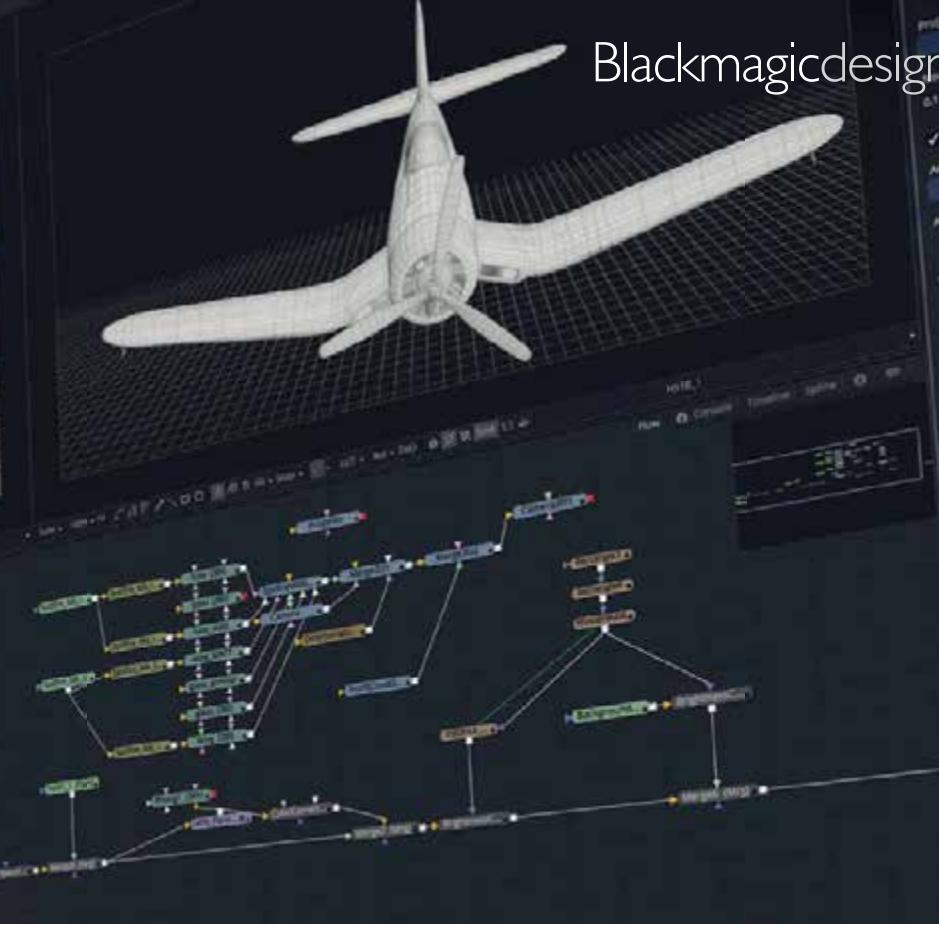




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# The Expert Panel

This issue features ten pro artists...



## REZA ABEDI

[rezaabedi.artstation.com](http://rezaabedi.artstation.com)



Reza used ZBrush to sculpt his fantastic cover image, and you can join him and four other talented artists on p24 for their top workflow and style guides in the sculpting package.

3DArtist username RezaAbedi



## PAUL CHAMBERS

[paulchambers3D.com](http://paulchambers3D.com)



We saw Paul's incredible Blender animation online a while back and decided to make it into a feature! Find out how to create a papercraft world of your own on p40.

3DArtist username paulchambers3D



## IGOR SOBOLEVSKY

[www.artstation.com/artist/igoq](http://www.artstation.com/artist/igoq)



Igor returns to the magazine this month to show off his admirable vehicle design skills in Maya, which will help you develop your own futuristic concepts. You'll find his tutorial on p48.

3DArtist username igoq



## ALVARO MATAS & PABLO M BRAVO

[jenue.net](http://jenue.net)



There's a lot to be said for creating typography for advertising and more in 3D rather than relying on traditional methods. Join Alvaro and Pablo on p56 for their Cinema 4D masterclass.

3DArtist username n/a



## DANIEL D'AVILA

[davilastudio.com](http://davilastudio.com)



If you want to create colourful and diverse abstract renders, look no further than Daniel's expert MODO tutorial on p62. His crazy render is based on a 2D illustration and has loads of character.

3DArtist username dddavila



## JAMES BRADY

[www.artstation.com/artist/jamesbrady](http://www.artstation.com/artist/jamesbrady)



Any of you that played the *Silent Hill* games back in the day will remember how oppressive and frightening the environments were. James has used this as his inspiration on p68.

3DArtist username Sabertooth\_00



## SEAN KENNEDY

[openvisualfx.com](http://openvisualfx.com)



Once again, Sean is on hand to show us just how diverse Blender is with an expert matchmove and compositing tutorial on p72. Make sure you download all the supporting files from FileSilo!

3DArtist username hyperfx



## VIKRANT DALAL

[project01studio.blogspot.in](http://project01studio.blogspot.in)



Motion graphics feature heavily in all walks of CG nowadays, from film and games right through to advertising. Create your own in 3ds Max with Vikrant's guide on p76.

3DArtist username vikrant\_dalal



## PAUL CHAMPION

[linkedin.com/in/pchampion](http://linkedin.com/in/pchampion)



As a demonstrator at Bournemouth University's NCCA, Paul spends half of his life in Maya, making him the perfect person to review Maya 2017. Find out what he thought on p84.

3DArtist username Rocker

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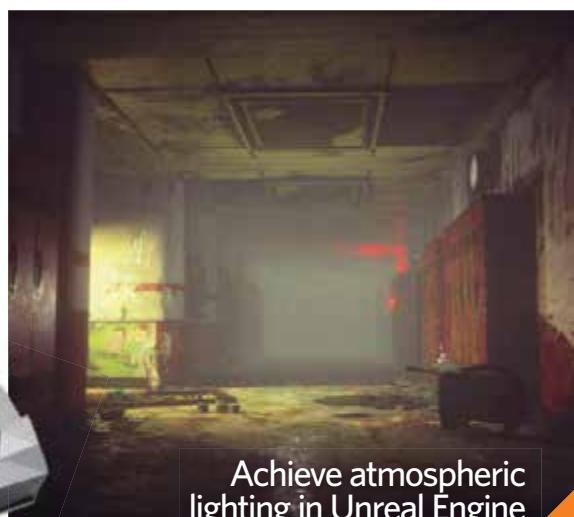
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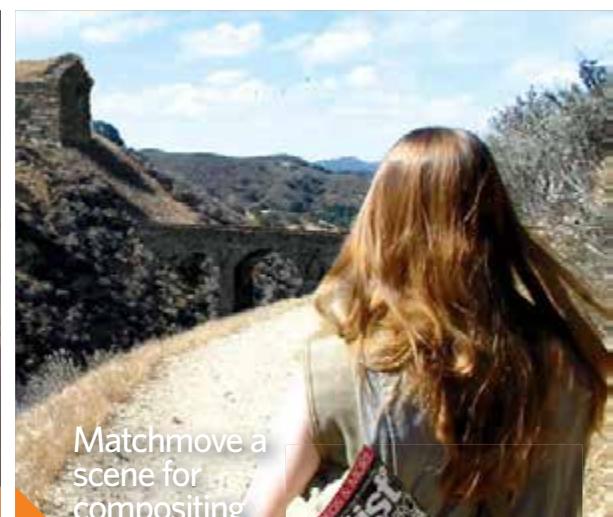


Go an extra step beyond low-poly by finding or making tileable paper textures

**Paul Chambers** on creating his papercraft style **Page 42**



Achieve atmospheric lighting in Unreal Engine



Matchmove a scene for compositing

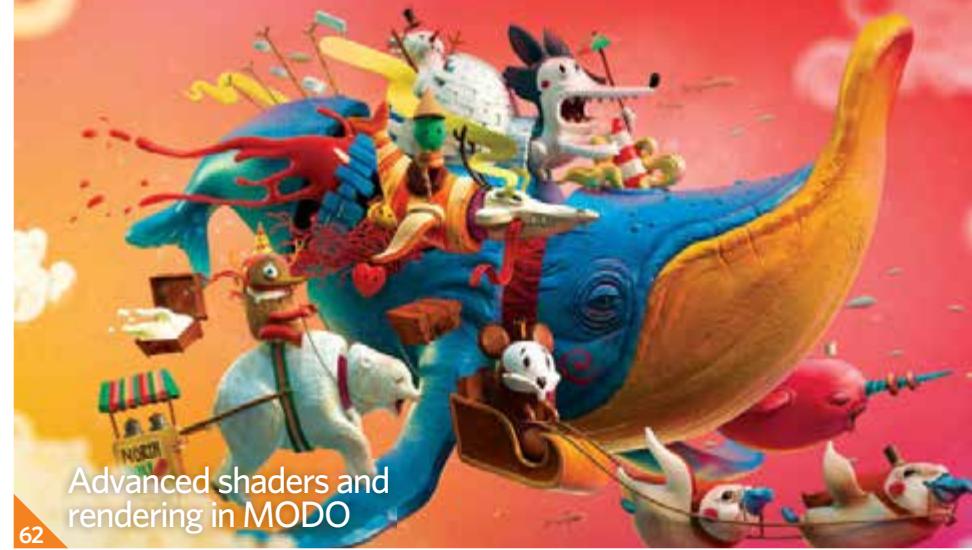


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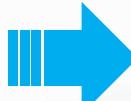
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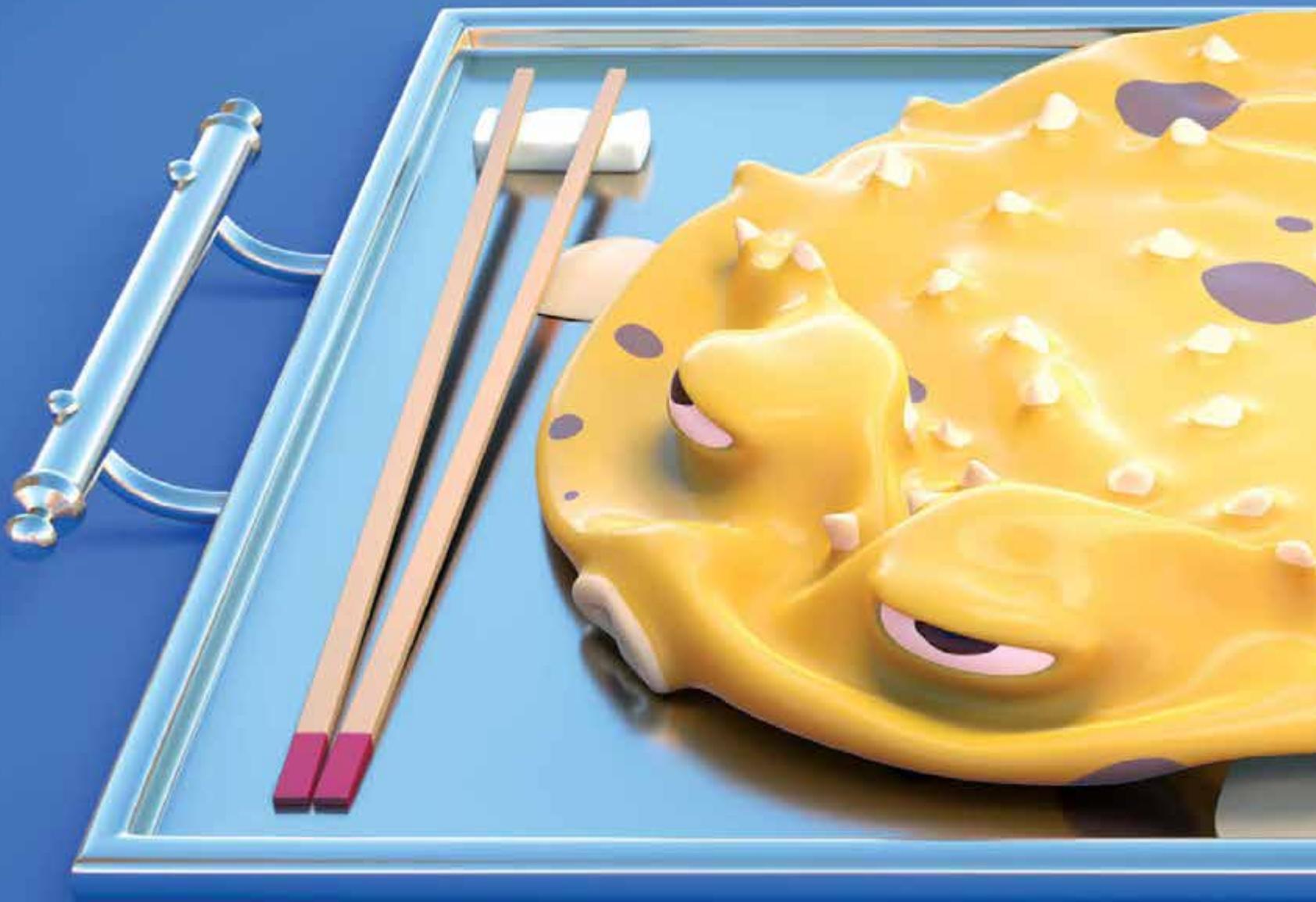
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# The Gallery

Have an image you feel passionate about? Get your artwork featured in these pages  
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“My goal was to create a short animation loop for fun, and there was this adorable fish model by Marlene Raml lying around, just waiting to be animated. I jumped into Houdini, played with the Grain tools, created the shaders and lights and I was good to go. For the look of the fish I wanted to create a stylised rubber-toy feel, and [I wanted] the background to be clean and colourful”

**Philipp Buschauer,**  
*Blowfish*, 2016





**Philipp Buschauer**  
[www.bit.ly/2bsuflI](http://www.bit.ly/2bsuflI)

Philipp is a student from Austria finishing his Master's degree in digital arts

**Software** Houdini, Maya, Photoshop

**Work in progress...**





**Pintea Andrei Catalin**  
[www.tegmark.net](http://www.tegmark.net)

Graduate of the Architecture School at the Spiru Haret University in Bucharest

**Software** 3ds Max, V-Ray,  
Photoshop

**Work in progress...**



**“**In this image I tried to render a dystopian representation of Cyrus the Great. He was known to history as one of the greatest conquerors that ruled from the middle east all the way to the Balkans **”**

**Pintea Andrei Catalin,**  
Cyrus, 2016





“This is a concept I imagined in my home. It looks simple but cosy. I chose a blue colour scheme because I think it looks elegant but still modern, and I added an additional plant to make it look more fresh”

**Ngurah Arya Hartawan,**  
Blue Corner, 2016



**Ngurah A Hartawan**  
[behance.net/arcass013](http://behance.net/arcass013)

Ngurah is a freelance 3D artist with experience in 3D visuals for arch vis and environments

**Software** 3ds Max, V-Ray and Photoshop

**Work in progress...**



“My first idea was to create an image in the visual style of Wes Anderson’s great movies. However, after brainstorming some ideas together with a friend of mine, there was little left of Anderson in the end. I saw this project also as an opportunity to try out Zacharias Reinhart’s workflow as described in his great workshop ‘Movie Scene Creation in Blender 3D’.”

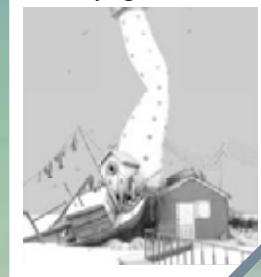
**Lukas Walzer,**  
High Tide, 2016



**Lukas Walzer**  
[www.lukas-walzer.de](http://www.lukas-walzer.de)

Lukas graduated with a degree in industrial design, though his interests include 3D graphics

**Software** Blender, Photoshop  
**Work in progress...**





“My idea came from fantasy novels and movies. I created an alien race leader – his body is very strong. It represents the power of the dark and he has powerful magic. It took me about six days to complete this work”

Xin Gao,  
*The Night the Emperor*, 2016



**Xin Gao**  
[ufocomm.cgsociety.org](http://ufocomm.cgsociety.org)

Xin Gao makes iOS games, and is responsible for modelling, rendering and texturing

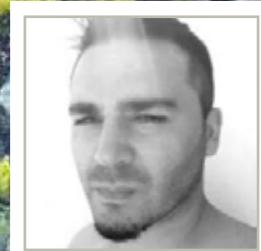
**Software** ZBrush, Photoshop  
**Work in progress...**



# The Gallery

In depth





**Sérgio Merêces**  
[www.sergiomereces.com](http://www.sergiomereces.com)

Sergio lives in Portugal and has been working on 3D visualisations for ten years

**Software** 3ds Max, V-Ray

**Work in progress...**



“ This was a 3D render of a place in nature to meditate. My goal was to create something unique with a lot of small details of nature, such as animals and ambient effects ”

**Sérgio Merêces**, *Meditation Garden*, 2016

“Before I started, I began to research references and find inspiration. Next, I made some rough sketches on paper so that I could realise my ideas for the final image”

Sérgio Merêces,  
*Meditation Garden*, 2016

#### COMPOSITION

**RIGHT** For the composition, I explored my initial idea by drawing a basic sketch on paper with what I had in mind for the camera and composition. Then, after I had the terrain modelled, I began to test all the scene objects in different configurations and positions until I was satisfied. I always observe the rule of thirds for all compositions.



#### VEGETATION

**RIGHT** The heart of this project was the vegetation and all the environment, so this is where I had to spend time featuring all the vegetation, such as grass, bushes, flowers and trees. For the grass I used Forest Pack presets, as well as for things like the water leaves and flowers. For the trees I used the Forest Pack plug-in for 3ds Max, which always helps with vegetation. Its features let you do almost anything! I created a Forest Pack modifier for each different type of foliage.





#### LIGHTING AND MOOD

The only scene light that I used for this project was a V-Ray dome with an HDRI. When you use an HDRI you must pay attention to increasing the dome samples to get a nice and clean result in the final render. The idea behind the mood was to get something shiny and warm to make the scene feel like summer.



#### POST-PRODUCTION

**LEFT** Post-production is always important to get nice colour corrections! For my personal projects I do everything in 3D, so in the end for post-production I only do small colour corrections with Curves, Levels and the Photo Looks plug-in for Photoshop. The animals and people were added in post-production in this project.



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Steve Holmes  
Editor

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## Four changes you asked for in 2015...

Last year we used your input to make some fantastic improvements, including...

### 1 More artist interviews

Since our last survey, we've acted on your desire for more artist-focused content with bigger and better interview-led features



### 2 Modelling tutorials

No one part of the 3D pipeline is more important than any other, but you called for more modelling guides and we provided just that

### 3 Videogames content

We asked you which industry was the most appealing to work in. You chose games, so we added more asset and real-time tutorials



### 4 Tips & Tricks

You highlighted that tip-led features and easy-to-digest guides were important to you, so we've pulled out all the stops this year

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# MODEL WITH IMPACT IN ZBRUSH

3D Artist goes behind the scenes with the creators of five stand-out ZBrush projects

Perhaps more than ever before, 3D artists are able to imagine a diverse array of creatures, characters and non-organic objects. In this feature, we're getting up close and personal with artists using ZBrush to craft anything from orcs and robots, to ornamental pillars. You'll see some of their brush choice secrets and workflow tips for getting the best out of ZBrush. You'll even find out shortcuts and special tricks for taking sculptures through to final renders.

These artists are some of the best using ZBrush today, from major studio personnel to those working as freelancers. Follow along as they break down the stages of their creations, letting you see work-in-progress images, and give tips about how to master certain types of ZBrush sculptures, such as convincing sci-characters, or stylish, low-poly character renders. Either way, you'll be inspired to keep creating.

# ORCHESTRATING AN ORC

Malaysia-based Reza Abedi breaks down the making of his 3D warrior



**REZA ABEDI**

[rezaabedi.artstation.com](http://rezaabedi.artstation.com)

Character artist, Streamline Studios

**01 Get started** I began with a DynaMesh Sphere and made the base mesh of the orc. When I finished the base mesh, I imported it into 3ds Max and started to block out the armour and other objects. After I finished the block out, I imported the orc into ZBrush and started sculpting the primary shape of the face. The main brushes that I used at this level were the Standard, Move, ClayBuildup, Dam\_Standard and Orb\_Cracks.

**02 Add details** To add in extra details I used some skin brushes. Some of these were gifts from my friend Rafael Souza and some of them are from Surface Mimic and Pixologic's Alpha Library. I tried to mix the brushes together to avoid using just one brush for each area.

**03 Create the wooden armour** To make the wood armour, I unwrapped the base shape of wood before I imported it to ZBrush, then I made the wood pattern in Photoshop and imported

as an Alpha in ZBrush. After that I masked the object by Alpha and inflated it. I added extra detail and more cracks with the Dam\_standard and Orb\_Cracks brushes.

**04 Generate orc hair** For the beard and the hair I masked the area that I wanted and opened the FiberMesh tool menu, pressed the Preview and started to tweak the parameters. When I was happy with the length, thickness, gravity and the base shape of the hair, I generated the FiberMesh. With the GroomHairLong brush and the Move brush I changed the position of the hair.

**05 Texture the model** After I completed the retopology and unwrapping of all the parts I started to bake the Normal map, ambient occlusion, curvature, world space normal, color ID and the Position map in Substance Designer. I attached the all parts together and imported it as a FBX file in Substance Painter. I linked all the maps that I baked in Substance Designer and started to make the textures.

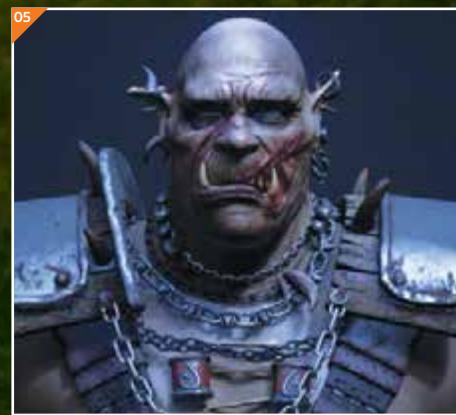
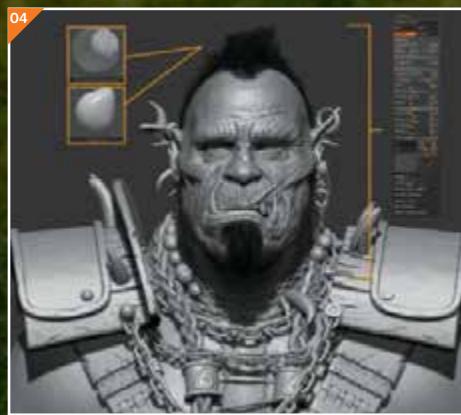
For some parts, such as the skin, I used the Smart Material as a base material and added extra layers and also hand painted on top of it. For some parts

like the chains I just found some images on Google to use as a reference and tried to make the material from scratch.

I used V-Ray for exporting the texture in Substance Painter and then I imported the textures into 3ds Max.

**06 The final look** I did the retopology and imported the all parts in 3ds Max. I used V-Ray for this project and first of all applied the grey material to all parts and started to add light. Usually the first light is a Dome light as well as HDR images for me to make some nice ambient light. When I'm happy with the ambient light, then I will add the second light, which is the main light, and this light has nice shadow.

When I was happy with the main light I turned it off and added the third light, keeping the dome light on. This light is the back light and I added a slight blue colour to it. Like the main light, I turned off the third light and added another back light that was warmer. After that, I turned all lights on and tweaked them a little until I was happy with it. When I was done with the lighting, I started to import the texture that I exported from Substance Painter and applied them to the V-Ray materials.





# CREATURE CREATION: BRUSH TIPS

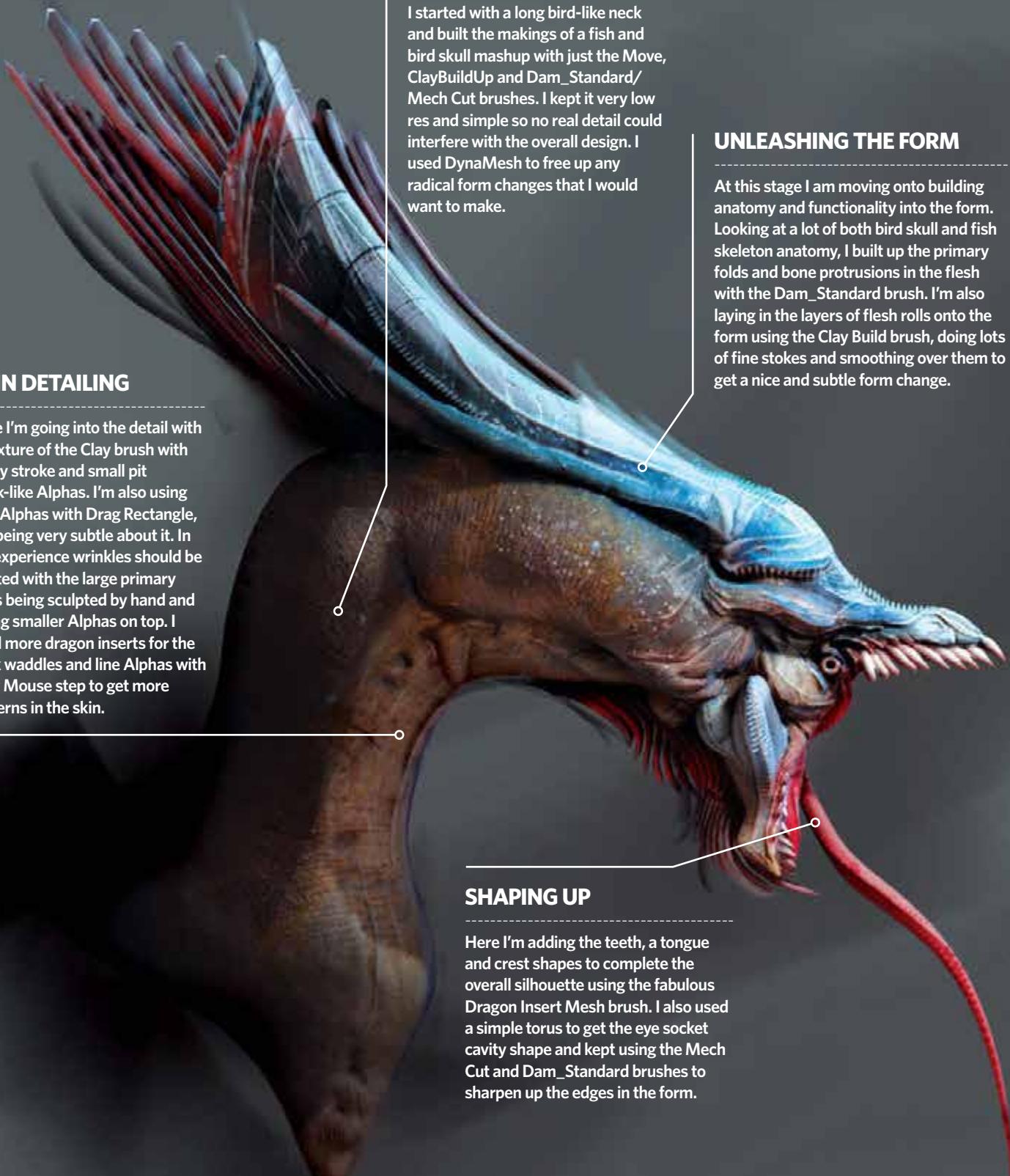
Tyler Smith annotates his dragon chicken sculpt with helpful brush tips



TYLER SMITH

[tsmith3d.artstation.com](http://tsmith3d.artstation.com)

Lead 3D artist/creative director, Illfonic



## SKIN DETAILING

Here I'm going into the detail with a mixture of the Clay brush with Spray stroke and small pit mark-like Alphas. I'm also using skin Alphas with Drag Rectangle, but being very subtle about it. In my experience wrinkles should be treated with the large primary folds being sculpted by hand and laying smaller Alphas on top. I used more dragon inserts for the neck waddles and line Alphas with Lazy Mouse step to get more patterns in the skin.

## ROUGH SKETCHING

I started with a long bird-like neck and built the makings of a fish and bird skull mashup with just the Move, ClayBuildUp and Dam\_Standard/Mech Cut brushes. I kept it very low res and simple so no real detail could interfere with the overall design. I used DynaMesh to free up any radical form changes that I would want to make.

## UNLEASHING THE FORM

At this stage I am moving onto building anatomy and functionality into the form. Looking at a lot of both bird skull and fish skeleton anatomy, I built up the primary folds and bone protrusions in the flesh with the Dam\_Standard brush. I'm also laying in the layers of flesh rolls onto the form using the Clay Build brush, doing lots of fine strokes and smoothing over them to get a nice and subtle form change.

## SHAPING UP

Here I'm adding the teeth, a tongue and crest shapes to complete the overall silhouette using the fabulous Dragon Insert Mesh brush. I also used a simple torus to get the eye socket cavity shape and kept using the Mech Cut and Dam\_Standard brushes to sharpen up the edges in the form.

# CRAFT LOW-POLY CHARACTERS

Finnish 3D artist Laura Peltomäki explains her tricks for sculpting a majestic owl priestess



LAURA PELTOMÄKI

[laloon.artstation.com](http://laloon.artstation.com)

3D character artist

- 1 Paint different subtools in various shades of grey and turn on the Flat Color material to see if any of the shapes don't work together.
- 2 Zoom out every once in a while to keep an eye on the detail level – sometimes less is more.
- 3 The Inflate brush is perfect for creating exaggerated shapes and features.
- 4 SliceCurve tools are a huge help when sketching the main shapes with DynaMesh.
- 5 Turning on the SmoothNormals from the Render Properties menu helps you to keep the polycount low while keeping the render surfaces looking nice and smooth.



# CREATE CONVINCING SCI-FI FIGURES

Munich-based Sven Rabe reveals the ZBrush skills behind his sci-fi creations



SVEN RABE

[svenrabe.artstation.com](http://svenrabe.artstation.com)

Lead modeller / senior 3D artist, LIGA 01

## What challenges did you encounter while crafting the visor for the CR-2 pilot in ZBrush?

For the visor, as it was a large and prominent piece of the design, I made various concept versions directly within ZBrush. Thanks to ZBrush, this can be done fast so you can focus more on the creative part. It was a bit harder to find the right ratio for the poly reduction to avoid artifacts in the smooth surface while keeping small details very crisp, especially for close-up renders. Therefore I used the Decimation Master plugin extensively.

## What were some of the key tools and techniques in ZBrush you followed?

I usually start with a concept sculpt by using DynaMesh with various brushes like Move,

ClayBuildUp, Dam\_Standard, Clay, TrimDynamic and hPolish. After retopologising individual pieces through ZRemesher and some manual ZSphere retopo work, I start adding details through brushes and Alphas with layers to organise everything and to stay flexible. Sometimes I use ZModeler to create base meshes for further detailing. Then, for the final rendering I use Decimation Master to reduce the polycount, add UVs through UVMaster and assemble all pieces back together.

## What do you think are some of the key things artists should keep in mind when crafting a sci-fi character like this and keeping it realistic?

Keeping a certain design language and rhythm of shapes throughout the whole piece is one of the key points in my opinion. Also a good balance between large areas and details is very important. Often, less is more, more is less. Always think of functionality and the purpose of your elements, as this gives your work more realism.

# GO ORNAMENTAL

Jamir Blanco, who works in Montreal at MPC, discusses how he sculpted a finely detailed pillar



JAMIR BLANCO

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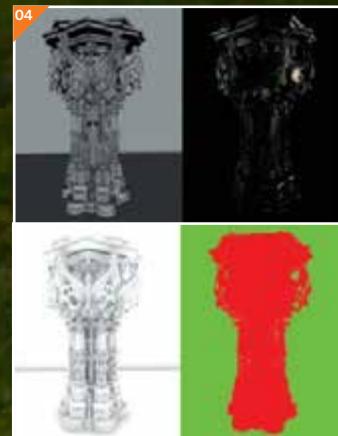
Environment artist, MPC

**01 Block out** I wanted to make a pillar-like object that could also serve as a standalone asset in a scene. I looked online for variations of pillars and ornaments to serve as base ideas and references. I started by sketching in ZBrush using standard low-res PolyMesh Cylinders and radial symmetry to quickly block out the object volume.

**02 Refine basic shapes** I refine each subtool individually. Since there's tons of Radial replication, I only needed to refine one tool. Then it's just duplicating and rotating them into the correct position to replace the remaining Radial Base subtools. I used the Deformations tab to rotate them into their correct positions as it makes use of the world origin as the pivot point.

**03 Add fine details** After this I introduced new and smaller details into the model. I usually handle this by modelling assembly pieces that can be used as Insert Mesh subtools. I modelled about four or five custom meshes to be used in conjunction with primitive geometry to 'set dress' the model. Set dressing is what we do in big environments, but the same principles will make the biggest difference for just one model.

**04 Light, render and post-production** I decimated the subtools down to something manageable in Maya, and exported everything combined. The rendering was handled in V-Ray and uses a simple three-point lighting setup. I create my key light first, then my fill, and use a sky dome for bounce light with GI. I then exported go-to passes for compositing in Photoshop, including Total Light, Reflection, AO and Object ID.



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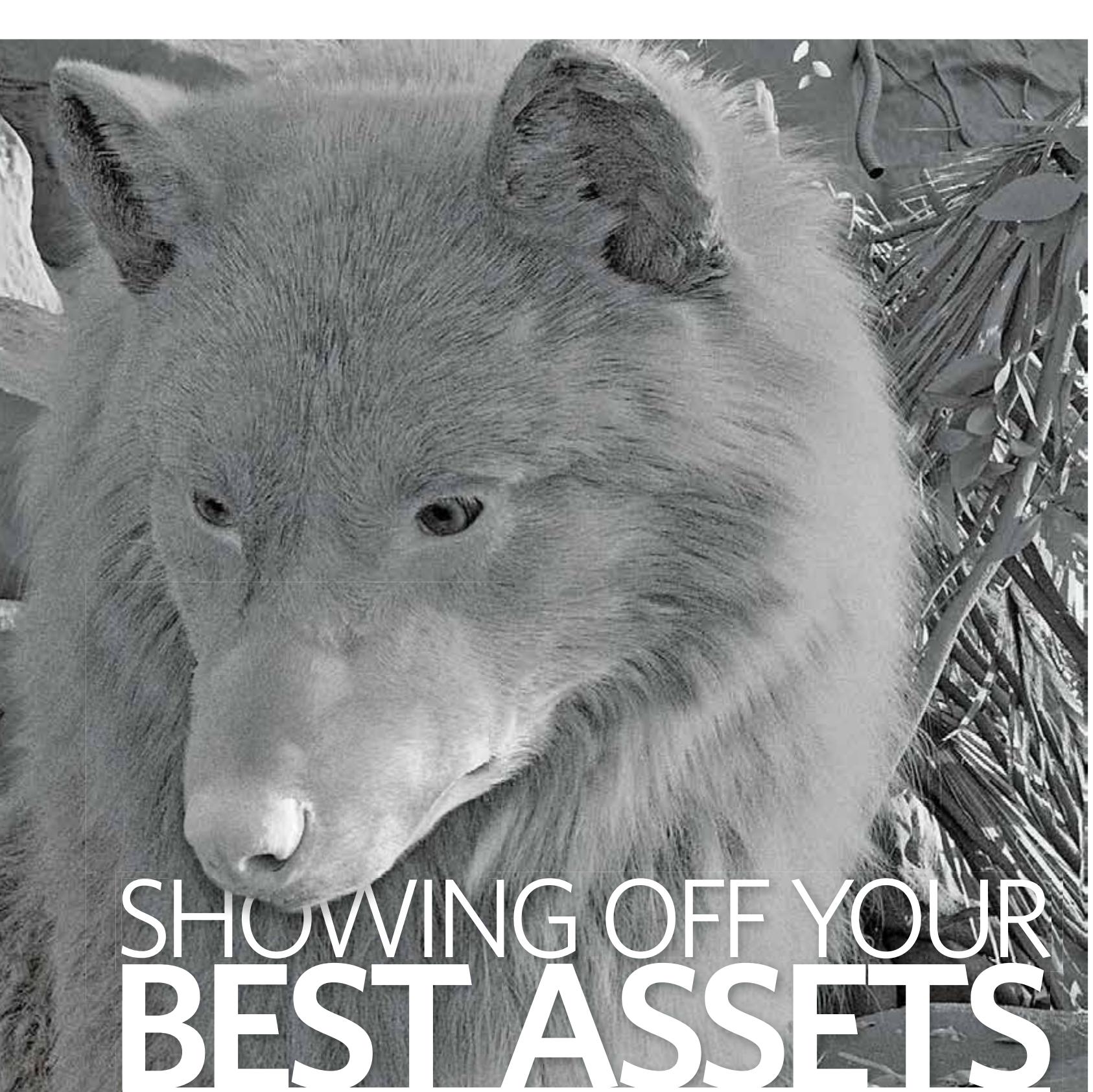
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Furtility is a plugin developed by MPC that helps with creating animal fur density, length and curve direction



# SHOWING OFF YOUR BEST ASSETS

3D Artist embeds itself with MPC's 3D assets team in London to see how some of the studio's most complicated models were made

**W**hen Jon Favreau's *The Jungle Book* was released earlier this year, audiences were enthralled by the live-action remake of the classic Disney tale. They also responded favourably to the photorealistic animals, many of which were digital models built by the assets team at MPC. 3D Artist sat down with the London team for an exclusive first-hand look at the tools and techniques they use.

Of course, it isn't just in *The Jungle Book* where MPC's assets team has showed off the studio's artistry. Films such as *Independence Day: Resurgence*, *Batman V Superman: Dawn Of Justice*, *Terminator: Genisys* and *Guardians Of The Galaxy* are among the many projects the department has had a major hand in. But how are 3D assets produced at MPC, and what are the secrets behind how they're made?



## MEET THE ASSETS TEAM

The assets department is a centralised department encompassing modelling, rigging, texturing, grooming (hair and fur) and look development. That means that any character, creature or hard-surface object required for a project MPC is working on goes through the department, even if shot production is taking place at another of MPC's offices, such as Vancouver or Montreal.

The team hovers at around 100 artists in both London and Bangalore, but can ramp up extensively for big shows like *The Jungle Book*. MPC hires regularly and looks for modellers, texturers, riggers and look dev artists at all levels. New starters tend to be 'buddied' up with someone in the same discipline who can "show them the ropes," according to MPC head of modelling Chris Uyede.

For one of the world's most prestigious visual effects studios, you might be surprised to hear that MPC relies mostly on off-the-shelf software in its assets department. However, over more than two decades, the team has built a variety of proprietary plug-ins and workflows that make its creature and character creation unique.

Autodesk's Maya sits at the core of the toolset for modelling, rigging and animation. Pixologic's ZBrush and Autodesk's Mudbox are used for sculpting and painting, with The Foundry's MARI and Adobe's Photoshop the main texturing tools.

On top of these tools (predominantly interwoven into Maya) are MPC's in-house solutions for rigging and muscle simulation and for grooming. The grooming tool Furtility, in particular, is one of the studio's most well-known and most developed, and has found extensive use in recent years.

## ASSETS IN ACTION

The tools of choice are certainly important, but after sitting down with the MPC team it's also apparent that their physically-based approach to asset creation is at the core of great characters. Take *The Jungle Book*, for example. The animals were photoreal, but they also had to meet certain filmmaker requirements. Baloo the bear, voiced by Bill Murray, was designed to be the same proportions as a Himalayan bear. Yet he also had to take on the characteristics of the actor.

"Sometimes you have to make it work somewhere in between," suggests MPC lead modeller and asset supervisor Giles Davies. "Usually we have to find the most realistic reference that we can and then make adjustments to him."

And that's exactly what MPC has excelled at; researching real reference and then crafting digital models that reflect the reference, but can still be adapted for a movie's needs. Another example is the Bengal tiger Shere Khan (Idris

*Guardians Of The Galaxy*'s Groot was complex, requiring a rigid, animatable model capable of expressing emotion

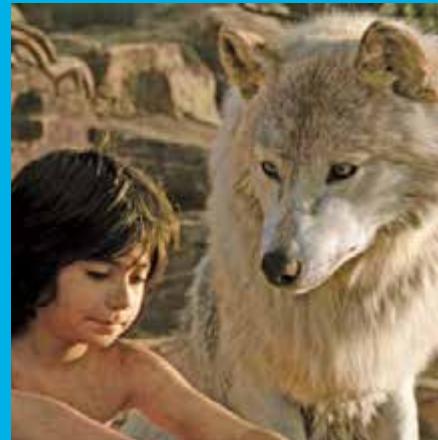
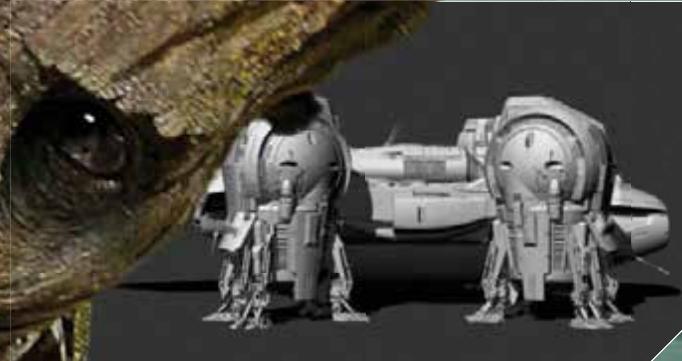


**"We have to find the most realistic reference that we can and then make adjustments"**

**Giles Davies**, lead modeller and asset supervisor



This highly-detailed spaceship from *Prometheus* was modelled by Lisa Gonzalez and Gerald Blaise



The detailed CG fur required for the wolf Raksha (Lupita Nyong'o) in *The Jungle Book*

## FUR-A-Q

**MPC's lead modeller and asset supervisor Giles Davies reveals the tech behind the studio's hair and fur grooming tool, Furtility**

**3DArtist:** What is Furtility?

**Davies:** Furtility is a plugin for Maya, which was first developed for the mammoths in *10,000 BC*. It's comprised of a number of specific elements. There's hand-shaping curves, which are basically guide curves. So generally you'll be following a bunch of reference with these curves and seeing which direction the fur is flowing. They'll be particular patterns. You're looking at density and length in those early stages. So, almost quite by hand, you're mapping out the flow of the fur at this stage.

**3DArtist:** What kinds of grooming does the plugin let you do?

**Davies:** You start off with something almost like a ball of fluff, and then add in further operating procedures. There are a whole different raft of attributes – density maps, length, scrabble, how much the individual fur is compressing, attenuation, clumping. Clumping is probably the most important, as it allows you to adjust the feel and wetness of a character or give the illusion of dirt and matting in the fur. You can also use it for feathers, vegetation and even things like ropes.

**3DArtist:** Fur can be notoriously difficult to simulate – how flexible is Furtility?

**Davies:** It's a bit like painting on a canvas, but you're painting on a UV pelt. You end up with a lot of black and white mattes, which will result in the fur being more dense here, less dense there, having more clumping or less clumping. Multiplying those in different ways and blending and biasing them in different ways gives you the different looks.

## CORE ASSETS

Behind the scenes of four of MPC's most elaborate models



### JUNGLE BOOK'S COMPLEX CREATURES

MPC modelled 224 variations of 54 animal species. In doing so, MPC would generate 1,984 terabytes of data during the making and run over 240,000,000 render farm hours.



### DIGITAL ARNIE IN TERMINATOR: GENISYS

MPC's CG Arnie model was built of around 1 million polygons for the body, and a further 250,000-plus polygons for extra elements like eyes, teeth and nails.



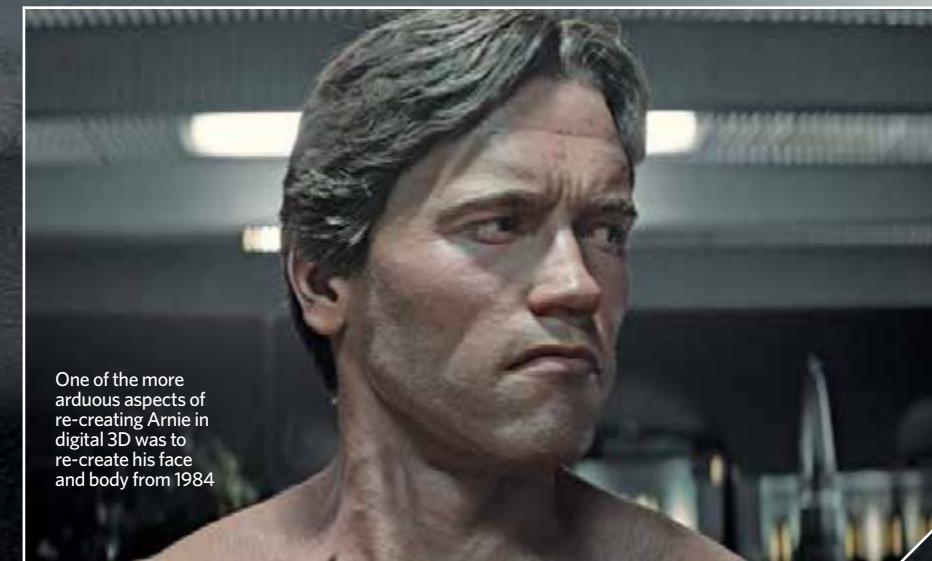
### MAKING GODZILLA'S MODEL ROAR

Godzilla took around eight months to sculpt in detail. MPC crafted multiple layers of mesh resolutions to simulate lower level muscle, mid-level folds, fine creasing and scale details.



### PROMETHEUS HAS LANDED

The *Prometheus* ship from the film was built from 3 million polygons. Artists incorporated 120 UV tiles into the model, each with a set of 8K maps made in MARI, Photoshop and NUKE.



One of the more arduous aspects of re-creating Arnie in digital 3D was to re-create his face and body from 1984





**“We've been working hard on developing new facial rigging, modelling and blend shape setups”**

**Chris Uyede**, head of modelling

Elba), whose fierceness was communicated via an enlarged body and, in particular, a skull twice as big as a normal Bengal.

The assets team relies on a collaborative pipeline to push models through. Modellers, riggers, texturers, groom artists and later animators and effects artists can all work separately on what's called an 'animated character package'. During the process, artists are always looking to add in elements from real life with the aim to give their assets some grounding.

The rigging process, in particular, reflects that real-world approach in that it uses physically correct modelled bones and has checks and balances to accurately cause skin and muscle deformation. "We most recently created what we just call the muscle primitive," says head of rigging at MPC, Tom Reed. "It's a toolkit for impacts and flesh protections that was made for *The Jungle Book* but instantly rolled out for *Terminator: Genisys* and other films."

"We have daily sessions twice a week here to talk about all the developments," adds Reed. "We're constantly trying to make sure the technology evolves and is not forgotten, and that new techniques get shared. One of the strengths of how we approach the department as a centralised team means we can really get this stuff used everywhere straight away."

*Terminator: Genisys* was certainly one of the benefits of that desire to keep on top of the tech, but it was also one of MPC's most difficult challenges, since it required the creation of a fully photorealistic digital human. Not only that, it was a human whom millions around the world instantly recognise: Arnold Schwarzenegger. And just to make it even harder, it had to be Arnie as he appeared in the original *Terminator* film in 1984.

Although the actor is, of course, still alive, the assets team did not have a way to scan and photograph Schwarzenegger as he was 30 years ago. However, they did have access to a scan of a bust made of the actor at the time and they could take advantage of some facial motion capture acquired using MOVA technology and scans of the on-set stunt stand-in.

Ultimately, these inputs served just as a base for intricate sculpting and modelling carried out by the assets department. Even then, and as MPC always does, it had to be adapted to the various shots required. "You couldn't just make one model to work in every shot," notes MPC lead modeller and texture artist Klaus Skovbo. "We ended up with a very hi-res mesh and any changes we did in the sculpt could be carried into the mesh."

With its 'digital Arnie', MPC also embarked on a heavy R&D effort into a FACS (facial action coding system) approach to replicating face and mouth shapes. "We've been working hard on developing new facial rigging, modelling and blend shape setups here," says Uyede.



Inside MPC's London visual effects studio, located in the heart of Soho

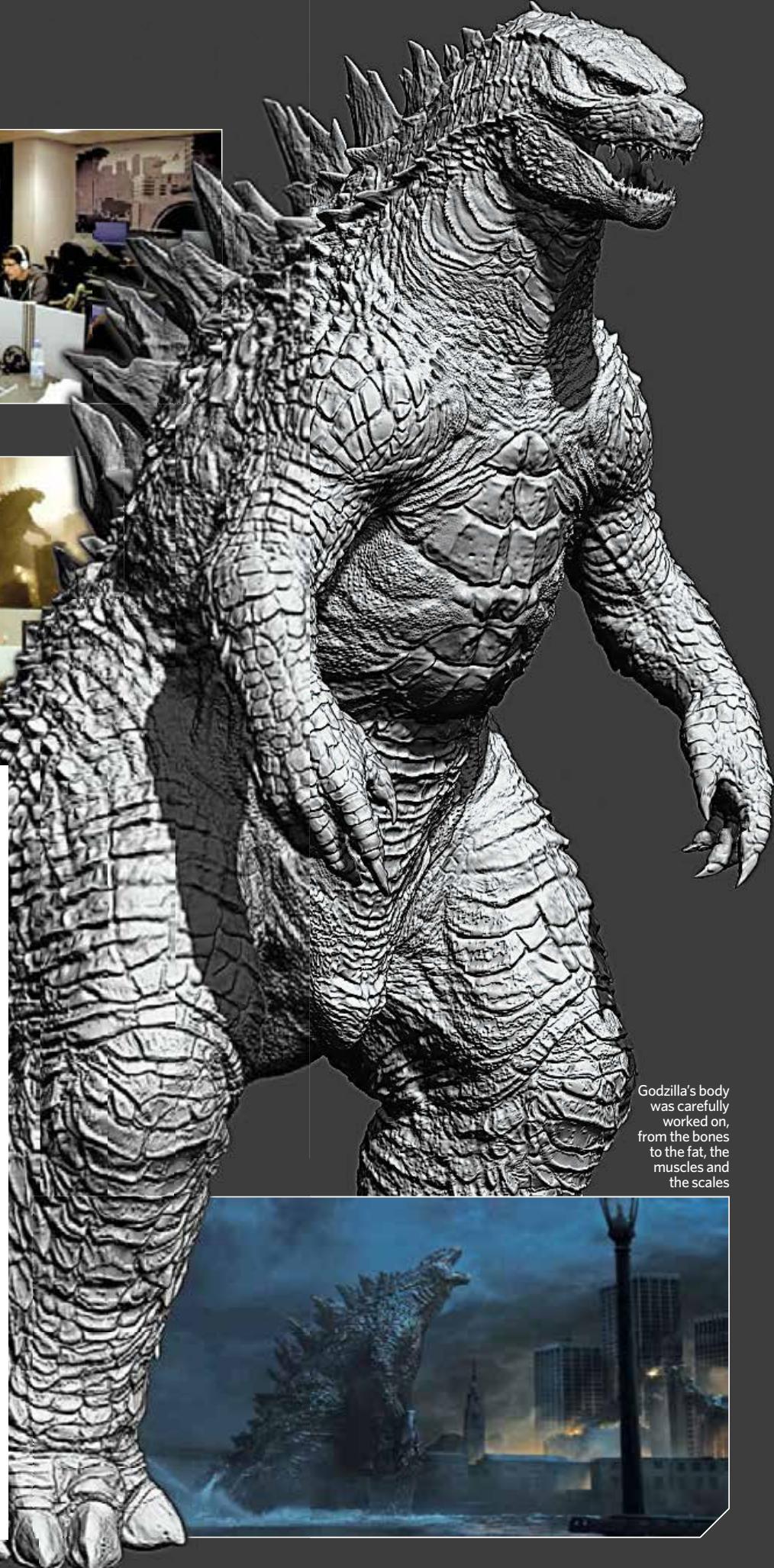


Originally, this was to enable a CG Schwarzenegger to deliver a significant number of lines of dialogue, but in the final film there were much fewer required. Still, the work on the FACS system, and on the muscle and bone simulation work done in general for *Genisys*, is able to be adapted for future use at MPC on future projects.

For example, on *The Jungle Book*, the FACS approach was "anthropomorphised to animals," according to Davies. "It was a fun process because you're collecting a load of reference of, say, a bear, but a bear's face is muzzle-based so you just have to relay the muscles in our face to the muscles in theirs."

Not all of MPC's assets are organic characters or creatures, of course. Some of the most detailed of the studio's models can be seen in such films as *Prometheus*, *The Martian* and recently in *Independence Day: Resurgence*. For this sequel to the original alien invasion film, the team was charged with building, among other things, a 300-metre-tall moon cannon that appears in the opening sequence. Added to that was an alien mothership, and a moon base and a lunar environment that are destroyed – all of which nearly "broke Maya," according to Sue Rowe, the visual effects supervisor for MPC on *Resurgence*.

With future projects such as *Alien: Covenant*, *Ghost In The Shell* and *Justice League* on MPC's horizon, it's quite possible that even more complex and 'Maya breaking' assets will be created by the assets team. And that's something that, as audiences, we're always grateful for.



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# PAPERCRAFT ADVENTURES IN BLENDER





## Paul Chambers brings a world to life and shows you how to composite and light animated scenes

**P**apercraft is a delicate, often colourful art style that has seen many different methods and software attempt to re-create the look, but the results are almost always a static render. "I felt that there was a missed opportunity to bring this to life," says generalist Paul Chambers, on why he decided to be non-traditional and create an animated papercraft island.

But why has he chosen Blender? "I love how quickly it opens compared to something like Maya," he says. "I think the modelling tools are better than Maya, and I love how it can handle the entire pipeline from blocking to compositing."

Over the next few pages discover Chambers' 17-step guide for creating an animated short, and get inspired to break the mould yourself at home or in the studio.

**01 Use your time wisely** Adopting a low-poly look and using Blender's internal renderer are two ways to keep the modelling, materials and rendering on this project simple. Keep your focus - and time - on learning scene building and the basics of rigging and animation. All it takes is a quick pencil sketch to get going. The point is to make a basic turntable animation you can populate with small animation moments. Think about the island theme and what those moments might be. A bird diving? A fish jumping? A helicopter swooping?

**02 Get the basics down** Block out basic geometry: an ocean, island, architecture and any static objects. Set up a camera to frame the scene and add environmental lighting. Build the island at 0,0,0 to give you a central pivot. Add an Empty object there and parent your camera to it. Rotating the Empty's Z transform 360 degrees over 60 seconds with a linear curve gives you a simple loopable camera turntable. Set the project to 24fps to aid animation.

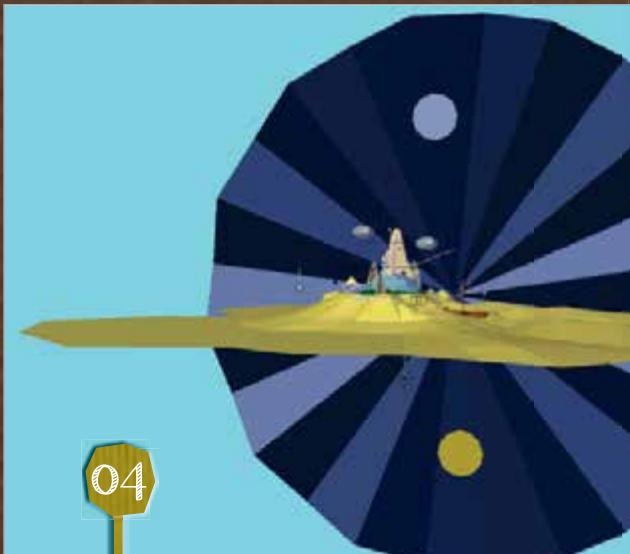
**03 Make camera moves more interesting** Add a child Empty to your central pivot Empty and connect the camera with a damped track constraint to make a Camera Target that you can animate independently. Animating the Z of the pivot Empty will let you move the entire camera rig up and down. Finally, animating the camera's focal length gives you control over zoom. You now have a basic camera rig; everything you need to keep the turntable spin, but also frame the action and climb into the sky or dive under the ocean. Using Bezier curves on the F-curves will keep all camera movement smooth.

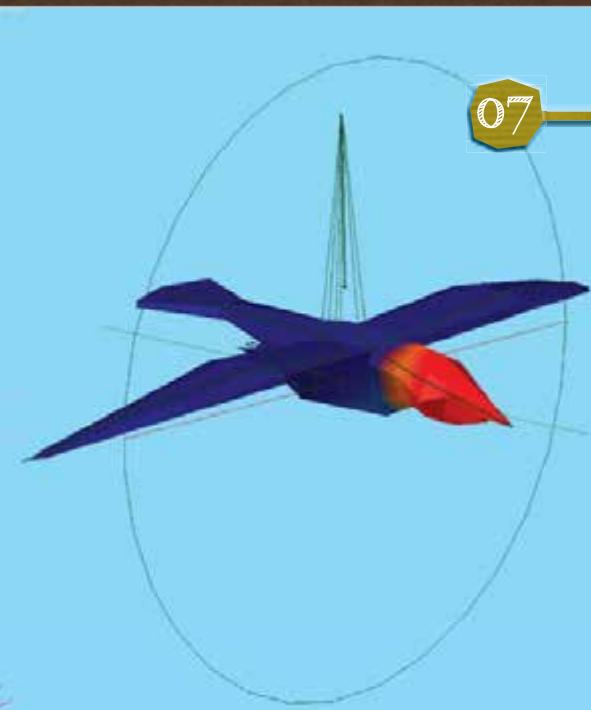
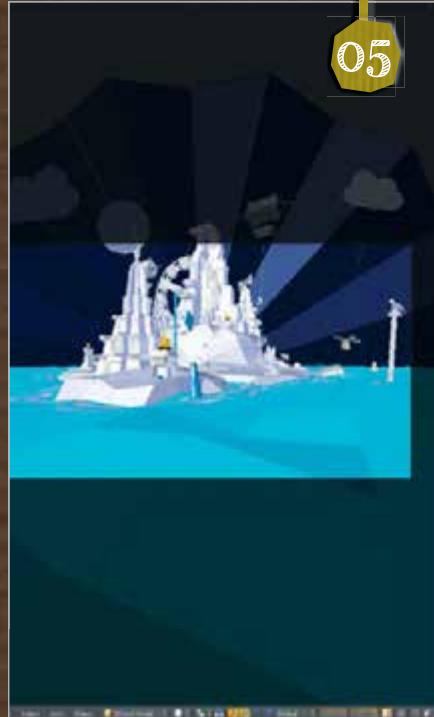
## Get the Papercraft look

Go an extra step beyond low-poly by finding or making tileable paper textures. Set Texture Mapping to Generated Coordinates and Cube Projection in the Properties > Texture tab and you may not even need UVs. Search 'Online Normal Map' for sites that will let you generate Normal and Specular maps from your base texture and add them to your material. Give the edges a folded paper look without adding geometry by adding a Wireframe Modifier in the Properties panel. Finally, use a procedural cloud texture with a gentle Displace Modifier to make the folds look more organic.



**04 Build a day-night cycle** Model a sky, clouds, sun and moon and give them basic materials. Parent these models to another Empty object to make a background group. Parent this group to the camera rig so that it always manages to stay in the camera's view. Animate the rotation of this background group over the length of your animation so that you can create your very own day-to-night cycle movement. You can also animate the colours of this backdrop by changing the diffuse colour of the materials and pressing the 'I' key to insert keyframes. Find a day, sunset, sunrise and night-time colour scheme, and a timing that feels right.

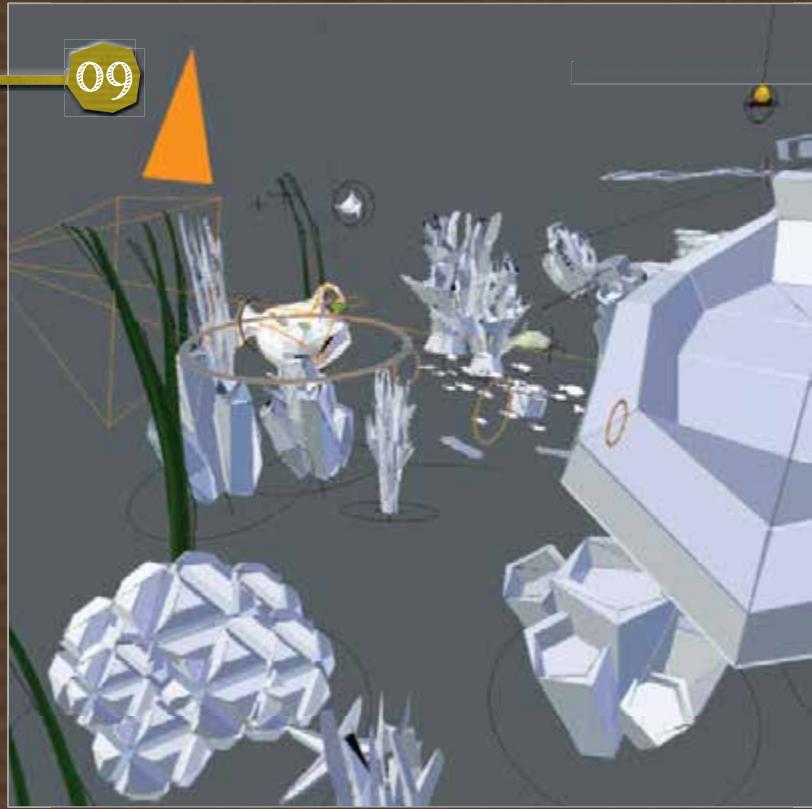
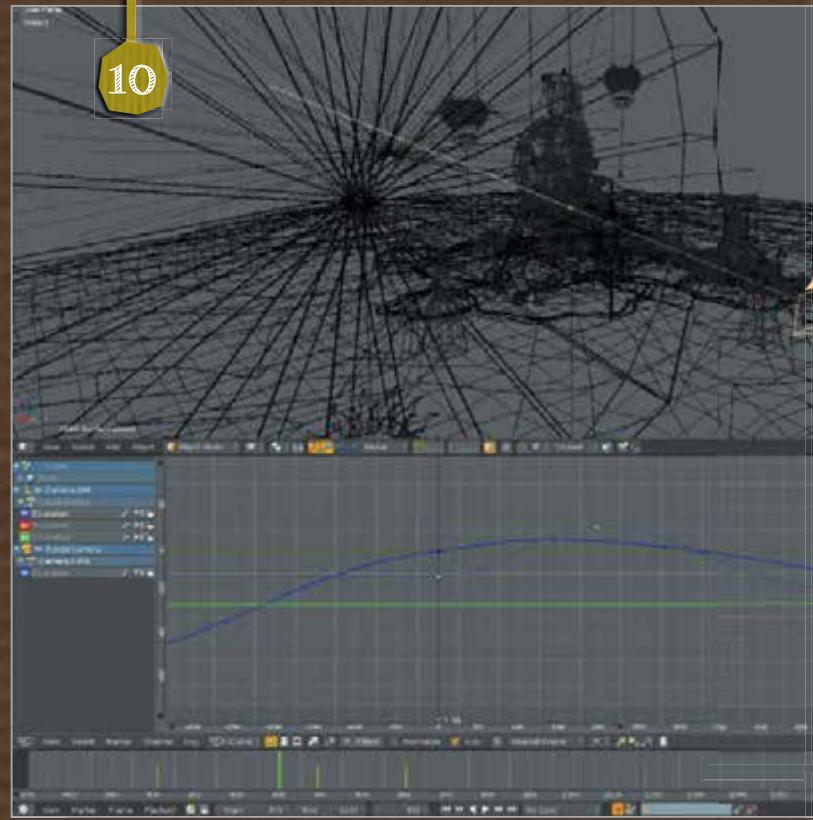
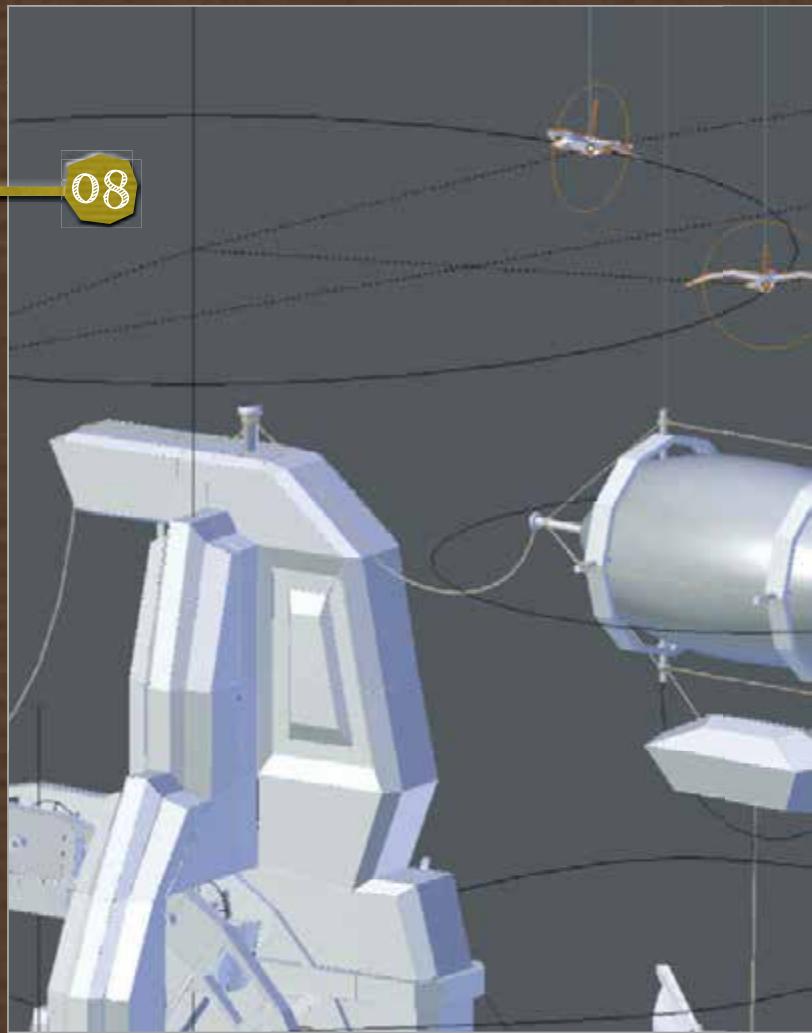


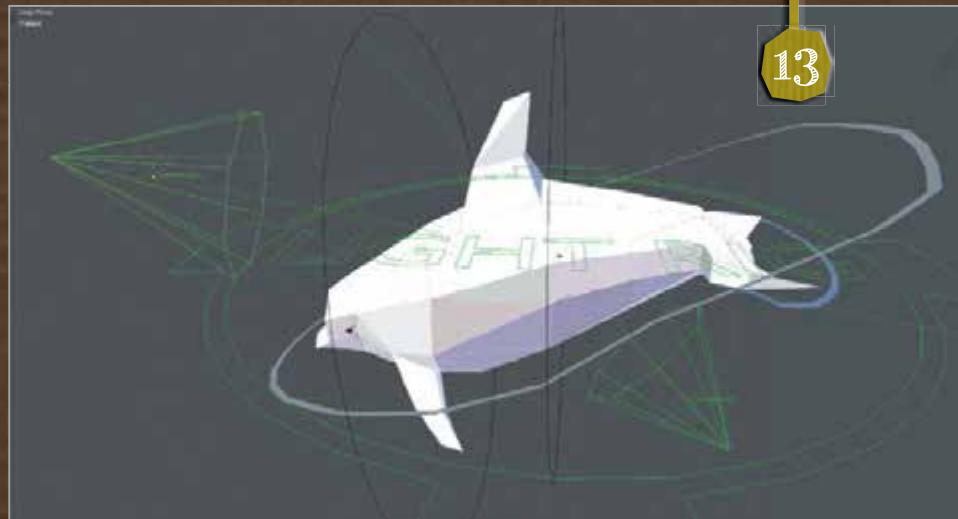


**05** **Link files** Building a scene with a lot of content quickly gets unwieldy. Start building props like trees and rocks in separate files and keep them in named directories. Keep files organised and iterative like 'assets/rocks/small\_rock\_001.blend'. In your main scene go to File>Link to import these objects while keeping them externally editable. Any individual edits you make can be quickly relinked by changing the filename iteration number under Blender File in the Outliner and reloading the scene. If you need duplicate objects, remember to use Opt/Alt+D so the copies always tie back to the external link.

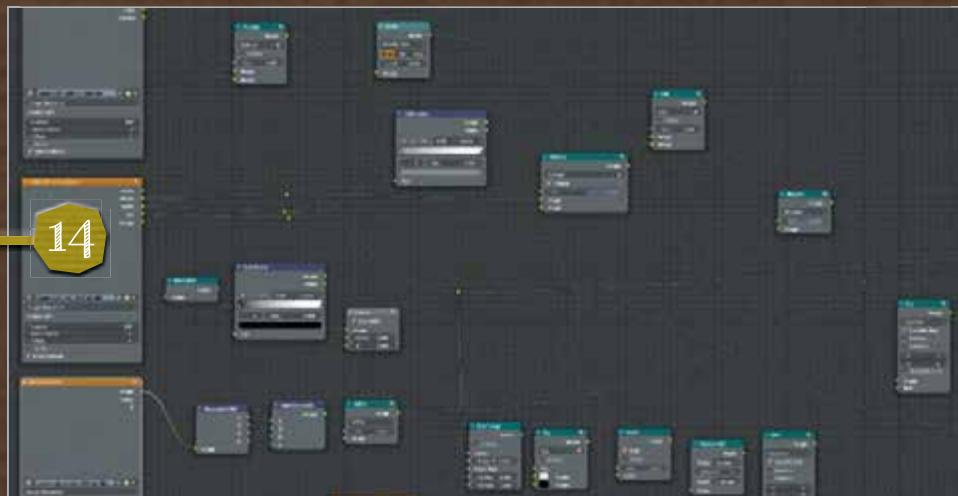
**06** **Prep models for linking** Simple geometry saves time for animating and makes rigging easier. Group models with several objects by selecting all and using Cmd/Ctrl+G. Name the group 'GRP\_Groupname' to make it easier to find in the Outliner of your main scene later. Make the group link-ready by centring it on 0,0,0 and apply all object transforms, scale and rotation with Cmd/Ctrl+A. Try linking a group into your main scene and adjust scale as necessary. Once you've found the right 1-1 match, apply scale again. Keeping scale 1-1 across all files will make linking and animating easier, especially with rigs.

**07** **Rig your models** Other than simple transforms, animated models will need a rig. Start with Add>Armature>Single Bone. Tab into Edit mode and start building your rig by extruding and naming bones. This is best done in Orthographic views. Tab out of Edit mode, pick your geometry, then Shift-select your armature and go to Object>Parent>With Automatic Weights. With low-poly geometry, Blender will do a nice job of automatically assigning weights. Any errors can be fixed in Weight Paint mode. When painting weights, bones are easily selected under Vertex Groups in the Data tab of the Properties panel.





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## How to use duplicate rigs

Blender can be fussy about linking duplicate identical armatures into one scene. Take three seagulls, for example. One way around this is to duplicate your finished rigs into separate files (so as Seagull\_A, Seagull\_B, Seagull\_C). Give unique names to the groups and the armatures in those files (so Seagull\_A.blend contains GRP\_Seagull\_A, and geometry posed with RIG\_Seagull\_A). Now you can link these groups into your main scene and turn them into unique Proxies that can be animated individually. If you don't do this, posing one duplicate rig will pose them all.

**08 Link rigs into your scene** Linking a rig into your scene requires a couple more steps than a static prop does. Make sure that any armatures that you have built have unique names and were added to the relevant named group in their file. Now when you link in that group, you'll pull in the armature as well. The linked group should appear at 0,0,0. To be able to animate the rig in your main scene, make it a proxy by pressing Cmd/Ctrl+Opt/Alt+P, then select the armature name from the drop-down menu. This should now mean that you can position and animate the rig at your own will.

**10 Animate your camera** Now that your main props and rigs have been successfully positioned, it's time to block in the camera framing. The camera is already passing around the scene, but you can now block in the Z of the camera rig to move up or down to mirror the action. Also available is the X,Y,Z of the Camera Target to point the camera at a specific object. Finally, you can block in the focal length to zoom in or out as necessary. You'll find that you're just blocking for now, and after you've animated your rigs, you'll want to massage these camera movements further.

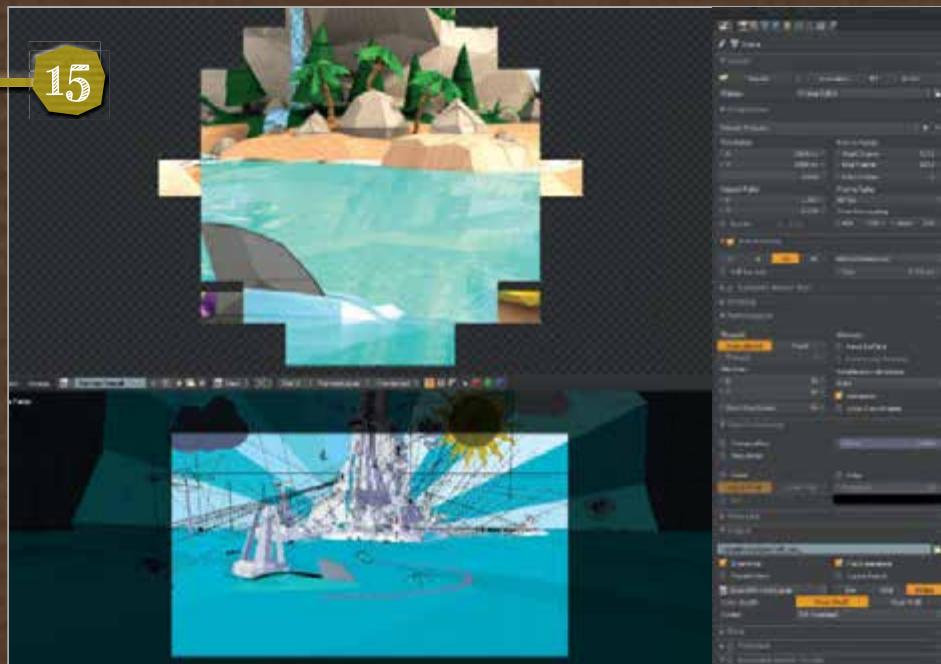
**09 Place rigs for timing** Start this process of blocking camera timing by placing your rigs so that when your camera passes them, it does so at an appropriate time of the day or night in the scene and at an appropriate distance. This will give you a sense of when you have gaps in your action to fill with animations that you may not have even thought of yet. If necessary, adjust geometry placement in the main scene to clear space or make space for more interesting composition. It's best to position your rig using the Proxy Group's transforms. Save the transforms of any bones within your rigs for animation.

**11 Block your animation** Your rig positions are blocked and so is your camera framing. It's time to block the armature animations. Stay broad, as this is a standard animation approach. Go one rig at a time and take your time. Pose your rig and insert keyframes for your key poses only. Timing out the action on paper and tapping your foot can help with this process. Keep playing short sections of the animation back and forth and adjust camera blocking as needed. Spend most of your animation time at this stage. Frame-by-frame animation later will be wasted if your key timing and framing here is poorly considered.

**12 Fine-tune your animation** I highly recommend you move into final animation only when you've got a strong blocking foundation. Have friends and forum members review your work and give feedback, as they'll spot things you didn't. To finesse, add new pose keyframes at halfway points between your existing keyframes. Review and adjust. Then split the difference and add more intermediate keys. Slowly you'll be building a frame-by-frame animation. Resist the urge to let Blender interpolate frames. The best animators work on stepped or constant splines – 'on 1s' (every frame) or 'on 2s' (every other). 'On 2s' can give a nice stop-motion look.

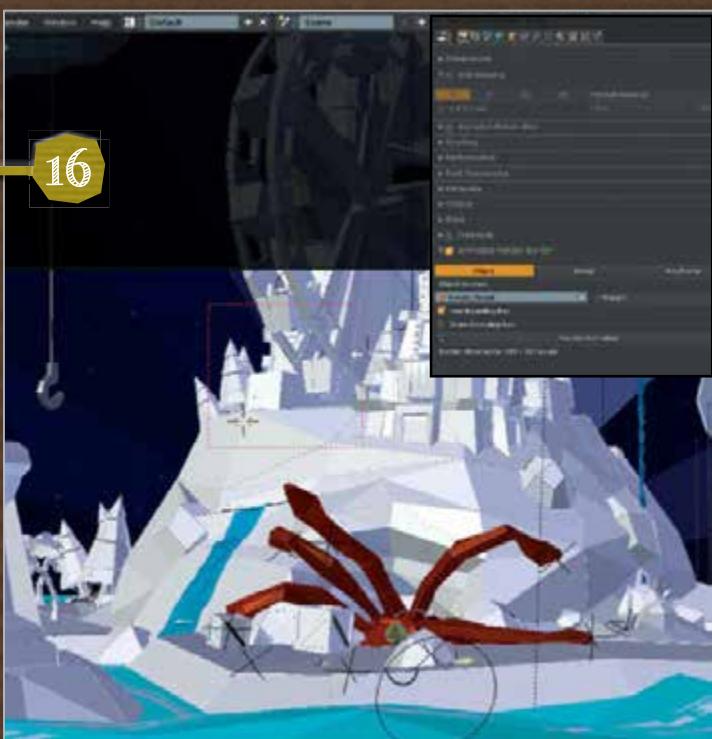
**13 Add lights and light rigs** Add lights to your scene, including two constrained to the sun and moon, and viewport render or test frames at 25 per cent of the final size with no anti-aliasing to get quick feedback. Next, add key, fill, rim and bounce lights to Empty parents to make light rigs. Constrain these rigs to your animated models. These can now be used to adjust the lighting on that specific model only. Make sure they only light specific subjects by moving the light rig and accompanying models to their own layer with 'M' and check This Layer Only under the lighting Property panels.

**14 Composite for flexibility** Now our animation and lighting is complete, it's time for finalising the look. Run some test renders. Use the Blender Node editor to adjust colour, tone and contrast, all of which can also be animated over time. If your camera moves underwater, consider an animated mask to give that section its own look. What about a different look for day and for night? Separate frame passes into a multi-layered OpenEXR – it's easy to do and gives you much more flexibility. Consider a separate Blender file just for compositing and bring in your passes using image input nodes.



## Create a tilt-shift effect

The papercraft look pairs nicely with a shallow depth of field. Output a Depth pass to the compositor, then send this pass to the Value inputs of two Map Range nodes. Drive the From Max inputs of these nodes with individual foreground and background values you can animate separately. The Map Range nodes in turn drive two black and white Mix node factors to generate two normalised greyscale images. Finally, use these images to drive the Size inputs of two Blur nodes on your render blurring the background, then the foreground.



**15 Run test renders** Run more test renders to check everything. Look for efficiencies to lower times. Aim for 15-20 minutes per frame on a modern machine at 1080p. Anti-aliasing is a big killer, so don't bump it any higher than necessary. Buffer shadows render faster than Ray shadows. Keep materials, reflections and refractions as simple as possible. Time spent optimising your scene now will cut the total render time dramatically in the long run. Before your final render, render one frame every ten frames using Frame Step in the Render panel. Adjust and render stepped frames again. Only render every frame when everything looks good.

**16 Fix renders with patches** Unfortunately you're probably not done rendering. Look for any errors. The good news is that doing separate passes has given you flexibility, so only re-render what you need. When possible, use Cmd/Ctrl+B to set render borders around only the part of the frame containing the error. Consider Ray Marlot's excellent Animated Render Border plug-in from Blender Market. You can then drop these patches back onto your previously rendered frames using an Alpha over Node in the editor. You can even separate out multi-layer EXR passes, patch them individually and reconstitute them, all in the Node editor. Very powerful.

**17 Complete your scene** Your visuals are complete, so now it's finally time to make your animation really stand out from the crowd by adding in some audio. Sound effects can be recorded with your phone or purchased cheaply online at websites like [www.pond5.com](http://www.pond5.com). I used the open-source video editor Shotcut to add sound to my scene, but you can also do it all within Blender's Non Linear editor if you prefer to keep it within its original software. Add some titles made in a paint program like Krita and your entire pipeline is open source, saving you money for your next project. Now get out there and share your animation with the world!

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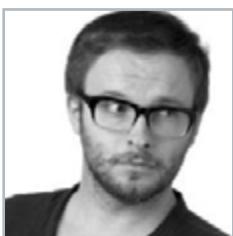
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**IGOR SOBOLEVSKY**  
Axiom AXM Fury, 2016

#### Software

Maya, KeyShot, Photoshop, Illustrator

#### Learn how to

- Develop a concept
- Create mechanical parts
- Model surfaces
- Texture materials in KeyShot
- Output precise masks
- Composite a final image

#### Concept

AXM Fury is the latest addition to the Axiom family of racing machines. This electric vehicle originally had a perfectly symmetrical design, however a year after its conception in 2035 the league moved to extended race durations. This development warranted the installation of additional power cells and cooling systems to manage excessive heat. As a result the cockpit had to be offset, and the body widened to accommodate these additional systems.

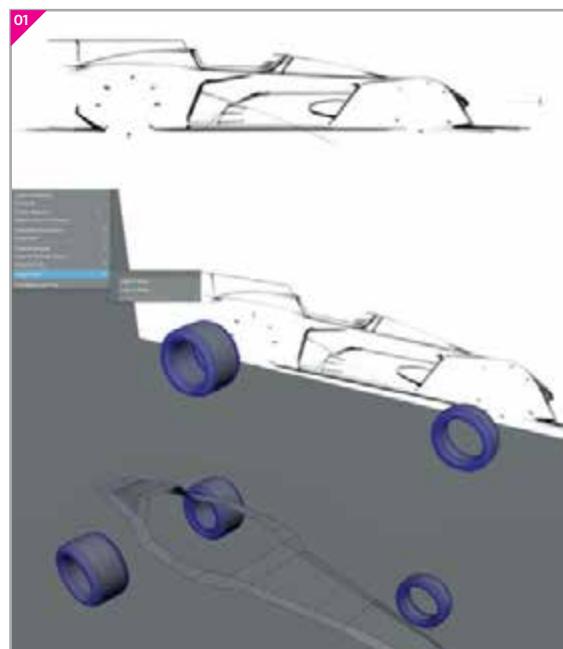


# Develop vehicle concepts in Maya

Design a race car from start to finish, inspired by Le Mans and Formula 1 cars, with the infusion of a fighter jet aesthetic

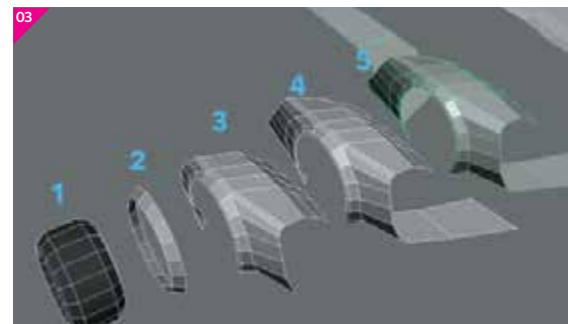
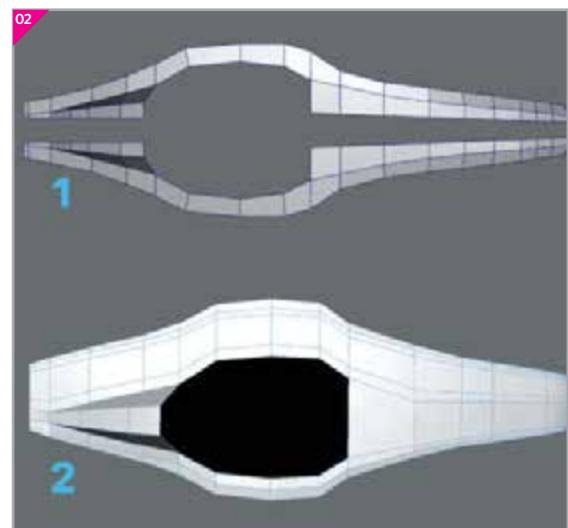
This tutorial will focus on automotive design in Maya 2016. Designing cars is fun and exciting, but the process can present some problems. Overall design, surfacing, stance, functionality and CMF all are areas of opportunity as well as challenges. We will go through the necessary steps to resolve these challenges and build a high-poly model of a near-future racing machine. You will design and build body surfaces with proper edge flow, comprehensive mechanical parts as well as interior elements. This process will allow us to experiment with some of the new tools in Maya and their application in a hard-surface workflow. With the aid of KeyShot, Photoshop and Illustrator you will produce a series of presentation-ready images that highlight and showcase the design of the vehicle.

**01 Block in** Sketch out a couple of views to pull together some ideas and to familiarise yourself with the overall form. Since this is a high-level concept we don't need to worry about small details yet. These images will be used as a starting point of the model block in. Select the Side viewport and go to the Local View menu to select the Image Plane option. This will import your sketch into the scene. Start by blocking in the stance of the vehicle by creating the wheels. Make sure to change the parameters of the primitive by making adjustments in Channel Box>Layer Editor. Position and space out the wheels. Create a plane with couple of subdivisions and be sure to move the vertices to block out the centre of the body.



**02 Make the main hull** Proceed by adding edge loops to further define the form. A great way to alter the edge flow is to use the Extrude tool and offset the faces. If you're working with the aim of creating symmetry, go to the Modeling Toolkit palette and activate Symmetry. By doing this, it'll enable you to work on the both sides of the hull at once. Elements that are highlighted in blue when you hover over them are symmetrical.

**03 Build the fairings and fenders** The nature of this design calls for large swooping fairings that improve the aerodynamics and reduce drag. The best way to start is with the actual tire. Select a ring of faces on the tire and duplicate the face. In this situation, 18 subdivision axes were used in order to provide enough resolution to construct the fairing. Select a number of edges on each side of the ring and extrude them. Proceed by extruding the edges on the top of the part and moving them in to make the top of the fairing. Keep an eye on how the edges are flowing.



• Tutorial screenshots

**“**When working with complex topology, try breaking down the design into elements that are easy to tackle **”**

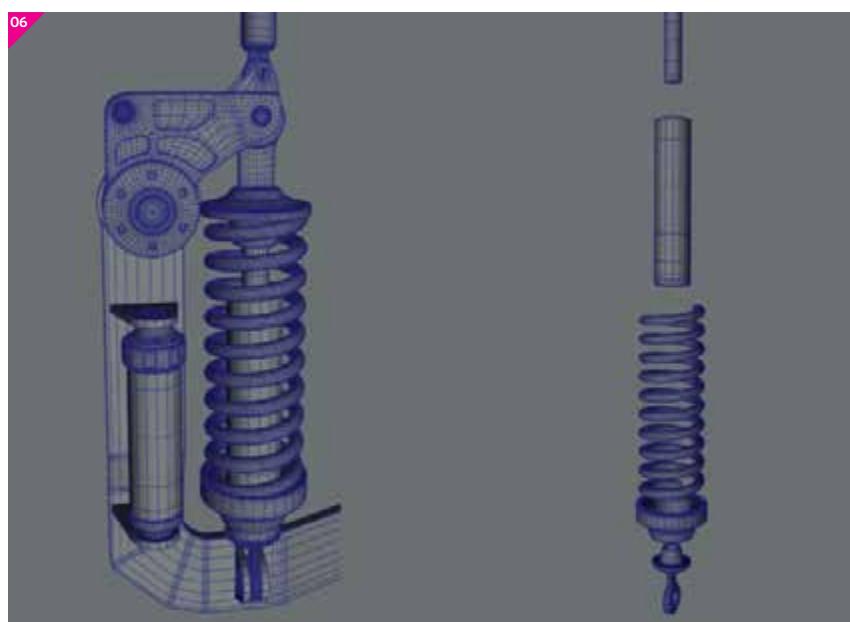
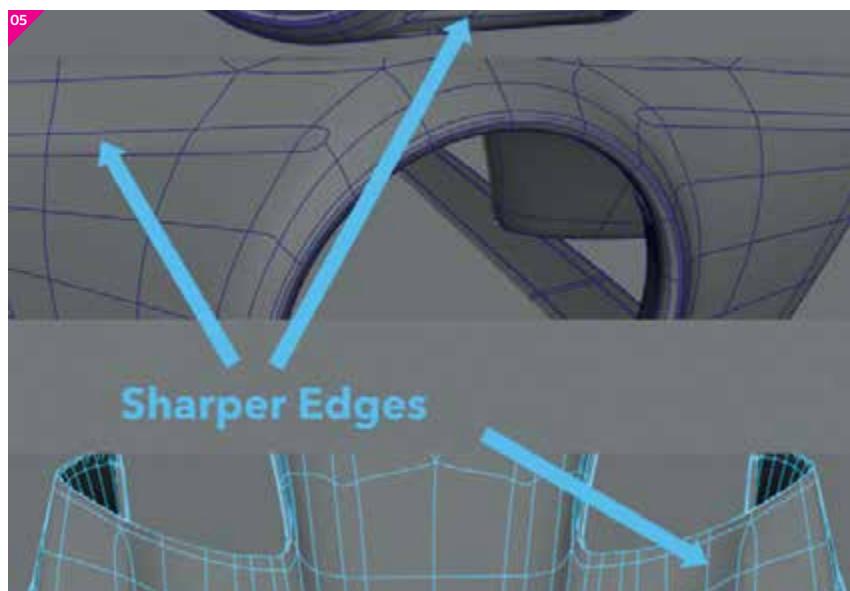
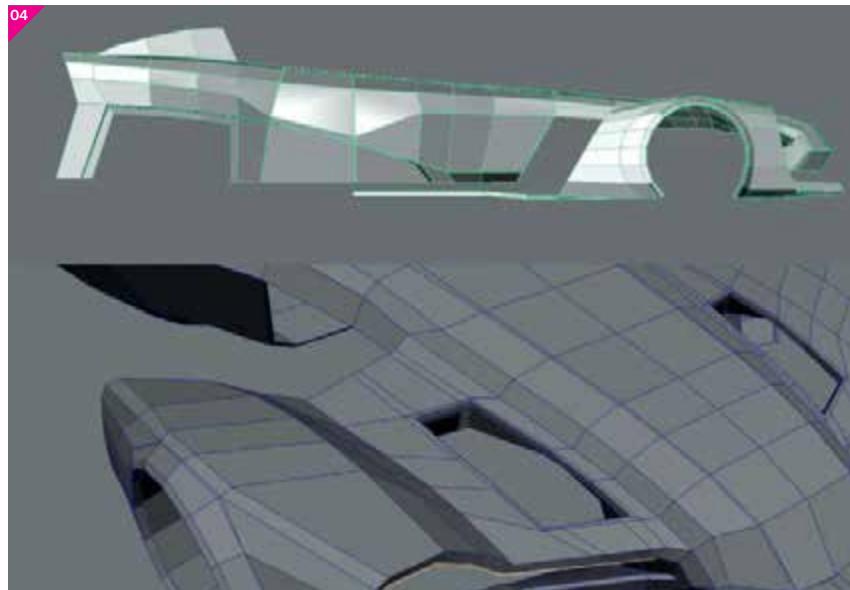
**04 Make the body panels** When you are satisfied with the initial body shape of your racer, begin adding additional parts and panels onto the base of your vehicle. Selecting and duplicating faces will help you to develop additional surfaces as separate parts – for example, the inset front of the car and the enclosure around the cockpit. These parts can later be combined to form one body when needed. The back quarter panel was made by duplicating the front fender and closing the open ring around the wheel. Use this method to generate separate parts as opposed to importing parts or creating a new shapes. When working with complex topology, try breaking down the design into elements that are easy to tackle. Always be sure to keep your edge count in mind – after all, an equal number of edges makes for easy geometry bridging while maintaining quads. A good example of this was the combination and bridge of the fairing and the main hull of the vehicle.

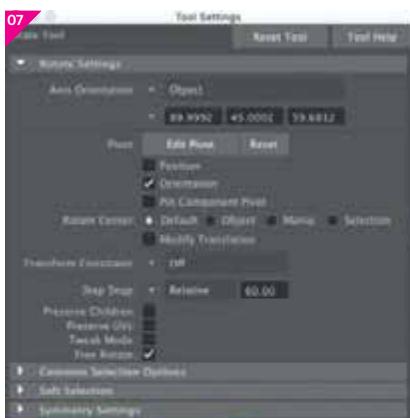
**05 Define the form** Once you are happy with the form you can start defining the shapes even further. Press ‘3’ to get a preview of the smoothed geometry. This will give you a better understanding of the form when it will be smoothed. Start adding edge loops to the areas of the design that need to possess harder edges. In some places you’ll find it helpful to use the Bevel tool to crease certain areas of geometry without creating a continuous edge loop. A good example is the area around the wheel well, where the geometry creases and flows into the fender flare and the hard edges that run along the nose of the vehicle. Use the Multi Cut tool to add additional edges to the form when needed.

**06 Model the suspension** The overall form of the vehicle leaves a number of exposed areas where we can showcase the intricate workings of the suspension. Start by importing a reference image of the suspension. A great example of this are the exposed shocks in the front of the vehicle. Block out the cylindrical parts first, then bridge the exposed areas. Use Align tools to centre the springs with the centre of the shock. Adjust the swing arms by selecting the areas that need to be moved, then press ‘D’ to align pivot and move them into place.

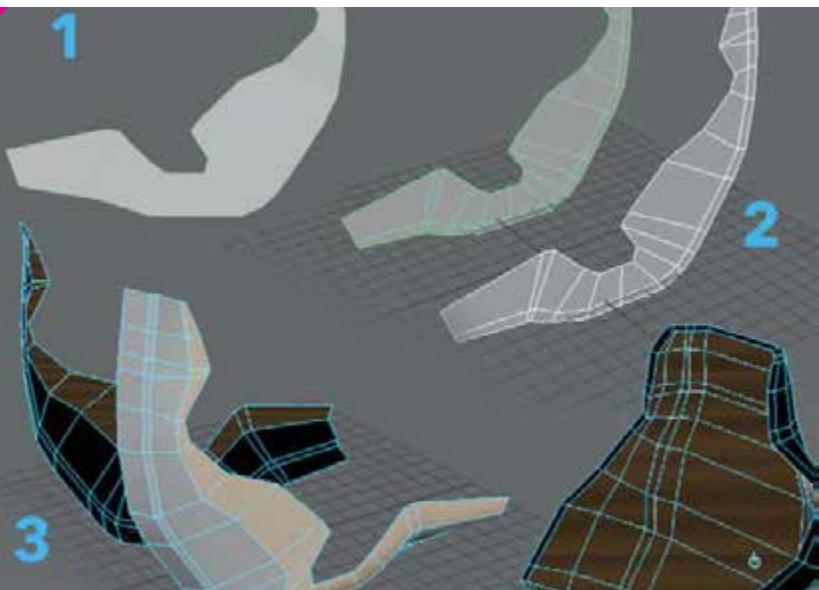
#### New Pivot tool use

The improvements to the basic Pivot tool are quite useful. When manipulating parts like shocks, struts or geometry in general, press ‘D’. This will activate the Edit Pivot tool. Just hover over a vertex, face or edge and you will get an Align prompt under the cursor. This operation will align the manipulator along selected elements. This way we can easily nudge a vertex, face or an edge along the surface of the form. Edit Pivot is especially useful when working with mechanical parts since it can be positioned along the edge flow of the part and mimic the pivot points of the part.

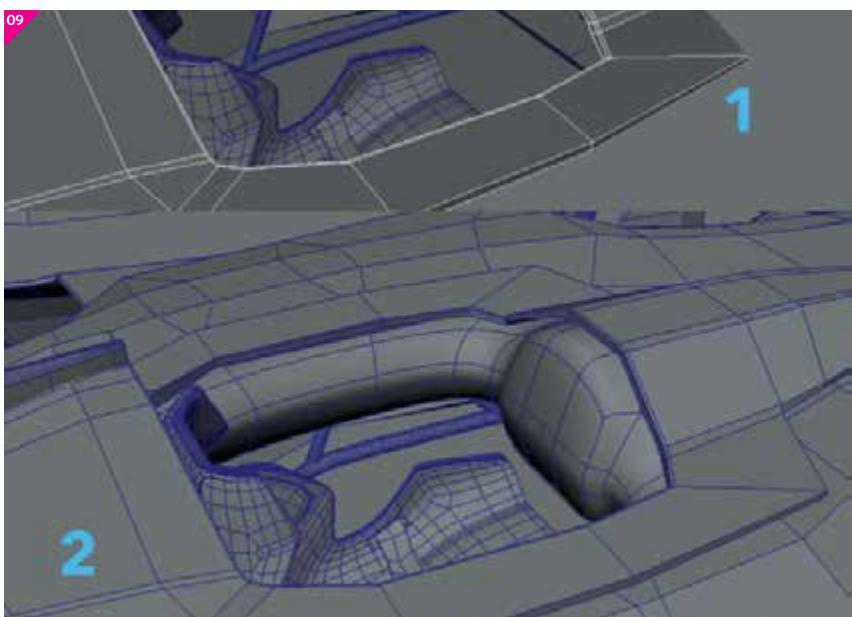




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## Understanding the purpose of mechanical elements

When working on the design it is important to take the time and get a basic understanding of how an object functions. For instance, the front pushrod suspension is inspired by the F1 vehicles. This system does not function like a traditional double wishbone suspension. Do some research and find videos and photos that demonstrate the function. This extra bit of research will help you to build a more believable model.

**07 Create the wheels and rims** Begin by creating a polygon cylinder with a subdivision axis on 12. This number will dictate the amount of spokes on the rims. In this case a subdivision of 12 will produce six spokes, so be sure to bear in mind how many spokes you want on the rims at this point. Select a horizontal edge on the cylinder and extrude it. This will become one of the spokes of the rim. Proceed by adding more edge loops and bending the shape. Select the outermost face and offset it. Isolate the spoke by deleting the rest of the cylinder. At this stage, note the position of the pivot point. It should be exactly in the centre of where the cylinder used to be. As soon as you are happy with the shape of the spoke, duplicate it and rotate it 60 degrees (to work out the angle, divide 360 by the number of spokes you have planned). Now bridge the centre of the hub to get a rim.

**08 Model the seat** To create the driving seat of your car, start by blocking out the seat and a steering wheel position and proportions. Once again, it's crucial that you use references to get an understanding of size relationships. Begin by laying in the profile of the seat. This can be easily achieved by manipulating a plane and adding edge loops to the areas that require the definition. Once you are satisfied with the seat profile, mirror the shape, separate them by a desired distance and bridge the two objects with four edge loops. At this point activate Symmetry and manipulate the geometry to add desired curvature to the object. Select faces through which the seat harnesses will extent and delete them. Extrude the object to add thickness to the seat. Draw a curve that flows along the seat, which will be the base for the harness straps.

**09 Build the dashboard** Let's begin by selecting a ring of faces on the cockpit opening and duplicate them. Next, extrude the part and add some edge loops. Continue to add definition by moving the faces, edges and vertices of the part. Select a number of faces in the centre and extrude them out. This will become the opening of the car's dashboard where the steering wheel will be inserted. Create a plane in the centre of the dashboard and apply a new shader to it. We will use this part later as an LCD display. At this point we need to consider how the vehicle would be operated and what controls it needs to feature on the dashboard. You'll need the steering wheel, but what other indicators, switches, dials and buttons do you need?

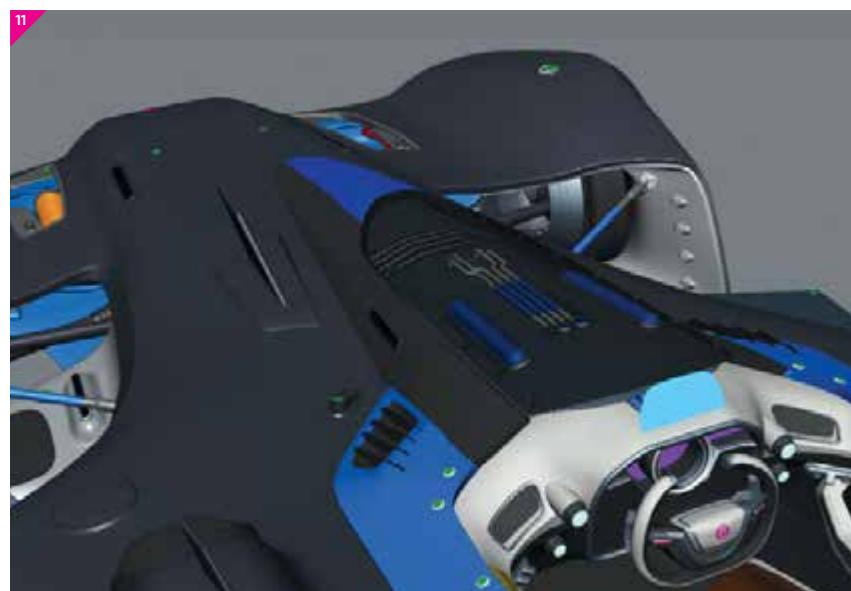
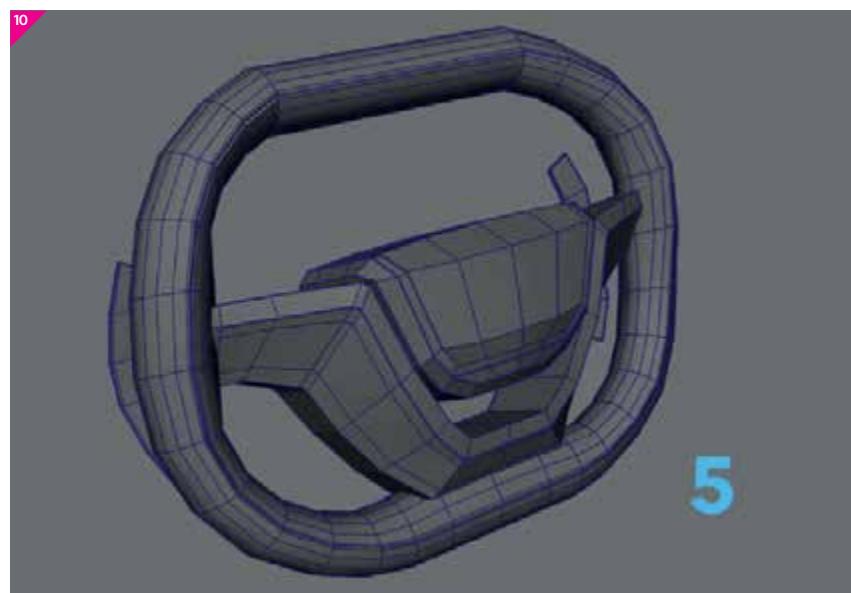
**“At this point we need to consider how the vehicle would be operated and what controls it needs to feature on the dashboard”**

**10 Make the steering wheel** Create a torus from the Poly Primitives menu, then widen the shape and add some edge loops to make a steering wheel shape. Select a ring of polygons on the inner side of the object and duplicate them. Proceed by bridging the edges of the duplicated shape to make the hub of the steering wheel. Extrude this shape and add some more volume by moving central vertices out. Select a group of faces in the centre of the steering wheel and offset them. Make the spokes by selecting three faces that would correspond to the connection point between spokes and the steering wheel. Extrude the edges of the spokes and create a U-shaped part.

**11 Add detail** If you're happy with the shape of the exterior and interior, you can start adding details. This process is relatively simple, but can be time consuming, depending on how much detail you want. Use the Isolate Select to show the piece you are working on to speed up the process. Press 'F' to frame it in the centre of the workspace. Transitions between parts are important in the modelling process - for instance, there are additional layers of rubber and adhesive between the metal and glass of the windscreens. As the windshield is long, you can use this space to add wiring and vents under the glass. Now you can start adding rivets and minor inserts.

**12 Pick a material** You should start considering colours and materials while you're still modelling. The materials should be a guide for a final look, though this doesn't have to be exact. Be sure to name and apply correct materials to parts on the model. For instance, the same glass shader was applied to the windshield as well as the headlights. When working with materials in KeyShot, some of the ones that are filed under the relevant category might not be the best ones to use - so instead of using metal, try using metallic paint instead. This material has so many more ways to be modified.

**“When working with materials in KeyShot, some of the ones that are filed under the relevant category might not be the best ones to use”**



### **Maya Bonus Tools**

Maya's Bonus Tools are a great addition to your modelling toolkit and have the potential to improve your workflow. This design can benefit from the use of these tools. A great example is a Curve To Tube Mesh tool. This can be found under Bonus Tools>Modeling. This command generates a tube mesh along a curve. The great part about it is that it is fully editable in terms of thickness, curvature, segments and so on. The same applies to a Curve To Ribbon Mesh tool. For instance, the harness straps were made by using this tool. Convert N-Sided Faces To Quads automatically converts your polygons to quads where it is possible.

13



### Manipulator size in Maya

When using Scale, Move and Rotate tools, consider changing the size of the manipulator by pressing the '+' or '-' keys. The size increase will give you greater precision when manipulating geometry for the ultimate accuracy.

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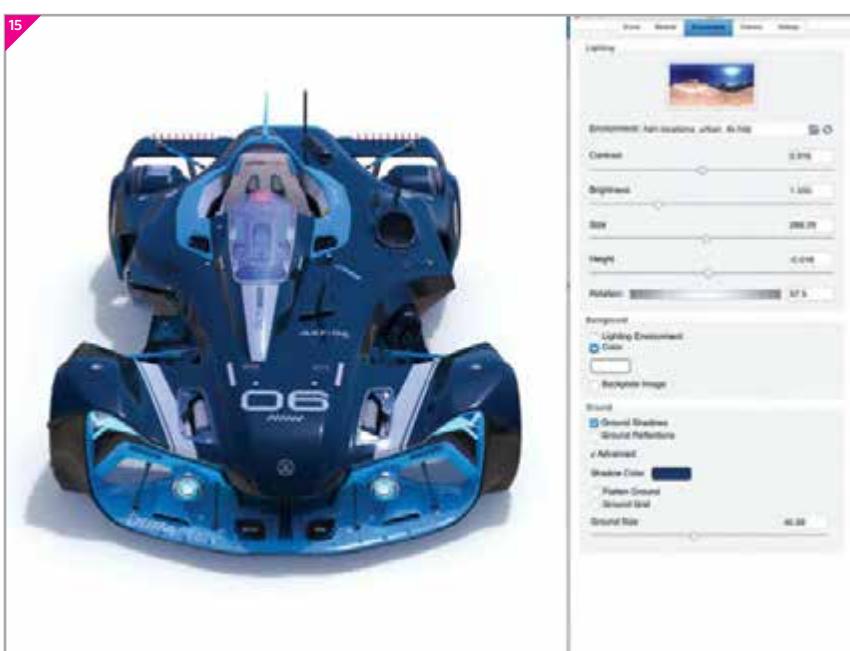


“Consider what would be important for the driver to see, including information like speed and battery charge”

**13 Design the graphic** When the colours, materials and finishes are set, begin designing the graphics. Let's screenshot a side and top of the car as well as the centre of the dashboard. Import these images into Adobe Illustrator and begin designing the decals. Work with the graphics in the areas of their final application so you can see the final result. It's important to keep your fonts consistent and highly visible – this is a race car, after all. Consider what would be important for the driver to see, including information like speed and battery charge. These should take priority over other graphics. Select the graphic the you want to export and go to Export Selected in the Illustrator File menu. Export these as PNG at about 400dpi. Since the dashboard UI will be applied as an Opacity mask, export the black artwork on a white background as a JPG.

**14 Apply decals** Select a part that's getting textured. In the Label section of the Material Preference menu, press '4' and apply a graphic to the part and experiment with the mapping modes to see which one yields the best results. Be sure to scroll down in the Label section and turn the Specular to white. This will allow the decal to get the reflectivity that matches the material underneath, therefore making it more realistic. Apply the dashboard UI image to the Emissive material in the dash, using an Opacity mask section of the material. To make this work properly, the UI image should have a solid background that exceeds the actual graphic area.

15



**15 Prepare the final render** Now that our materials and textures are finished, we can work on the HDRI. From Environments, pick a scene that that best showcases the model. If the render will be inserted into a scene in post, make sure that it has similar features and lighting conditions. At this point we need to save the cameras. This will help you to dial in the scene and lighting with a steady position of the model. You can further modify the HDRI by adding highlight pins in the Edit HDRI menu. Add pins in the areas that highlight the form of the design. In the Render menu, select Resolution, Samples and Ray Bounces. Go to the Passes section and check Clown Pass.

**16 Composite the image** Open a file in Photoshop and choose your resolution and size. Select the final render as well as the Clown Pass and drag them onto the canvas. It is crucial that both the render and the Clown Pass are positioned in exactly the same location on the canvas. Create a layer, apply a Linear gradient with dark and light-blue colours and then position it along the bottom. You'll notice that the shadow on the render looks unrealistic. Go to your Clown pass and select the Magic Wand tool with a Tolerance of 3. This way you can clip out the shadow in seconds. Finally, set the Blend mode to Multiply.



**17 Add adjustment layers and weathering** Now that your image is composited, you can start making alterations with adjustment layers. Once again, make sure to use the Clown Pass to your advantage. If a part of the Clown Pass is selected you can go to Layers>New Adjustment Layer>Levels, for instance. Notice that the generated mask is in the exact shape of your selection. Now you can make isolated changes to that particular area with a non-destructive result. Create Levels, Exposure and HLS adjustment layers to achieve an uncoated metal look. Make sure that a mask is selected and begin painting in scratches and weathering. Feel free to import textures and perform similar Clown Pass operations with them. Since our workflow is non-destructive, make the most of experimenting with looks.

# Showcase

## Igor Sobolevsky

Igor works in the fields of concept, graphic and industrial design. Currently, Igor is a designer at ZAGG, specialising in 3D modelling and product design.



### **Bomb Disposal Bot, 2016**

**Maya, ZBrush, KeyShot, Photoshop**

A robot designed for explosives diffusion and disposal. An array of sensors and cameras in conjunction with dexterous manipulators ensures a high rate of success.



### **Cosa Nostra Pizza Delivery Vehicle, 2015**

**Maya, Rhino, KeyShot, Photoshop**

Vehicle based on Neal Stephenson's book *Snow Crash*. This armored car will get your pizza delivered in 30 minutes or less no matter what.



### **MEV 2 Rover, 2015**

**Maya, ZBrush, Rhino, KeyShot, Photoshop**

Mars Exploration Vehicle developed for extended surface missions, while providing a crew of three space to work, collect samples and make EVAs with the aid of a large airlock.

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**ALVARO MATAS &  
PABLO M BRAVO**

*Yummy, 2015*

#### Software

Cinema 4D, ZBrush, Illustrator

#### Learn how to

- Use MoGraph for modelling
- Work with spline dynamics
- Transpose and sculpt in ZBrush
- Convert selections
- Sculpt in Cinema 4D

#### Concept

Yummy is a personal project made to experiment and to create something different, pushing the edges as far as we possibly can.



# Learn to sculpt complex type

Create your own unique typography with a tasty twist

We are going to mix creativity and experimentation for this tutorial on stylised typography. What we will do is mix our knowledge in a different and fresh way, in comparison to using some of the more traditional methods of modelling typography.

We will be utilising Cinema 4D to master the use of some slightly different tricks, and these will provide us with the chance to model and bring our assets to life by easy and fast means – all the while by taking advantage of the software's amazing tools. Pablo M Bravo will then later join us in the tutorial, and he will show us how to bring modelling details to life in ZBrush.

**01 From paper to a spline** Starting from sketches helps with the process of creation. The most important step to start a project is to visualise first in your mind what you are going to design and then to make a sketch of it. You should start with a pen and paper, and after you draw your typography, open Illustrator to create a vector that connects the beginning and the end of the type. Save your document in Illustrator 8 to import it to Cinema 4D.

**02 Sweep NURBS** The best way to model this piece is to use the vector that we created in Illustrator. To do so, we are going to take advantage of the awesome tools that Cinema 4D can offer us. First of all, select the NURBS tool and put a circle and a spline below it. Select it and go to the Object Properties menu. Using the Scale options, play around with it by putting the middle in the top, and see how our sweep starts small and gets thicker.

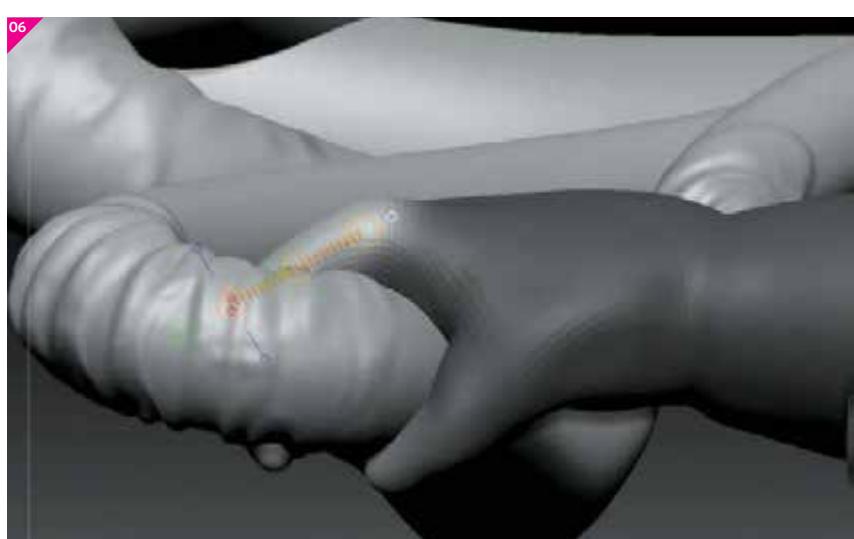
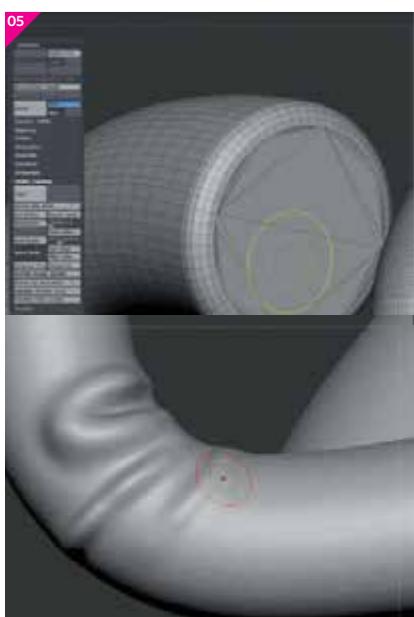
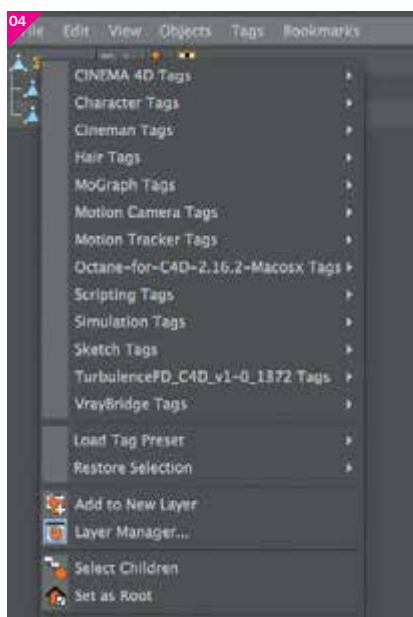
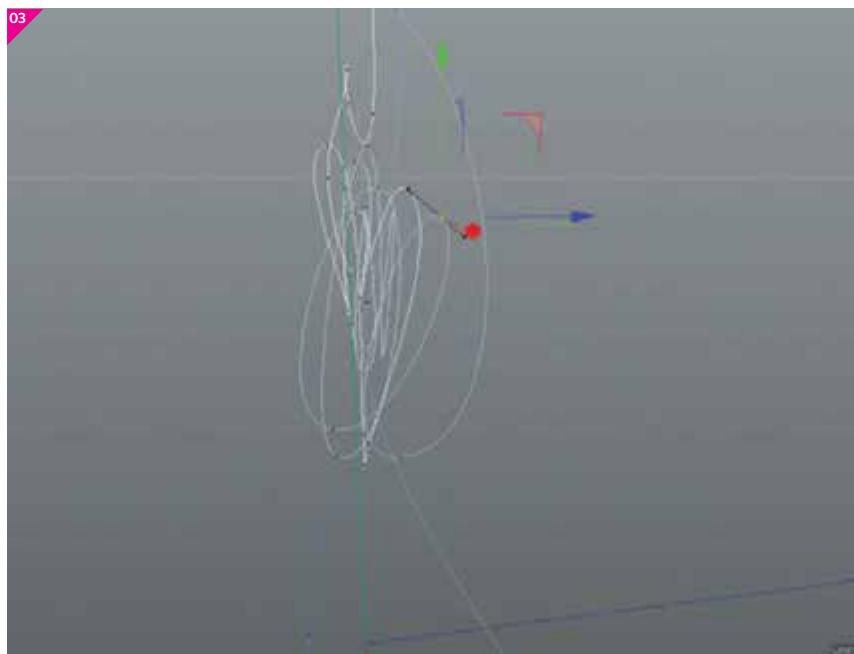
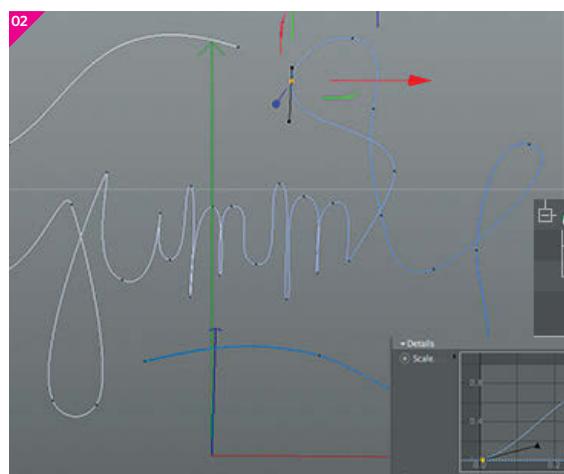
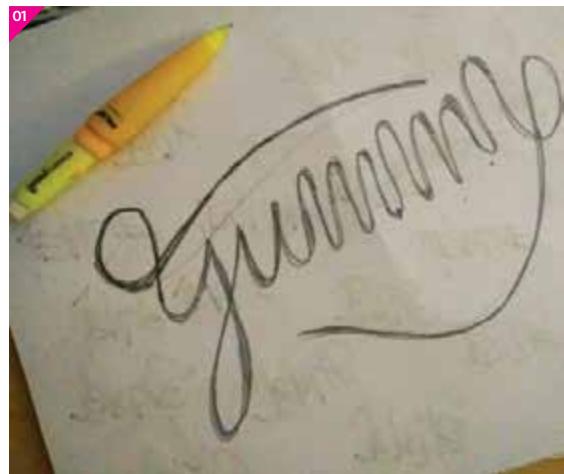
**03 Move the points** To make the type look really great, we are going to have to move the points of the spline that we have created. The best thing is to have just the minimum points on this one, as if you have too many points it will become more difficult to make a nice shape for the type. Go to Object Properties and in Intermediate Points select Uniform, and set a low number of points. Select the points of the types that go behind the strokes of the type and bring them to the back.

**04 Make it editable** When you are happy with your shape, it's time to make it editable and to sculpt on it!

After you press the Edit icon it will split into different parts. We need to select all these parts and Ctrl/right-click on them. Alternatively, go to Mesh Conversion and press Connect Objects and delete. After we have it edited in one object, go to the Mesh command and optimise the image. With this, all our polygons will join the ones that are not connected. We are now ready to sculpt and move some parts into ZBrush.

**05 Detail the mesh** Inside ZBrush, first of all go to the Geometry menu and press Modify Topology, then click in Weld Points. Bear in mind that some patches could still detach from Cinema 4D. Now use ZRemesher to get a better, cleaner topology that will give us more flexibility when working with the shape. Using just the Moving brush and moving its topology, you can further fix the shape of the model by focusing on the contours. Now we can subdivide and start to add the final cloth wrinkles. You can use a Standard brush and smooth it to get nice results. Try to follow the natural way of folding around the bend areas and smoothing around. Again, a good way to do so is by using references.

**06 Add the hands** Starting from a base hand mesh, you can sculpt a quick hand using a few references from the internet. After you're happy with the final look you can append the hands onto the rest of the model. Using Transpose, we can mask areas and smooth it to start positioning everything. At the same time, we will need to fix minor changes to make both tools work together and add extra details, such as wrinkles in the bending fingers and nails.



**07 Position the parts** Using the Transpose tool, mask areas and smooth them in order to start positioning everything. You can use the Automask option of Transpose, as it's a simple feature. Simply press 'R' to select rotation, then Shift-click and drag the mouse over the area you are trying to rotate. If you find a few problems using it in this way, go ahead and use the Mask tool as usual. The way that Transpose works is once you start dragging with your mouse, it will follow the surface of the model. To get better results when bending the fingers, after drag and drop use the Transpose tool, and reposition it to the centre of the volume, matching approximately the position of the finger joints, otherwise the pivot rotation will be too far from the centre of the finger.

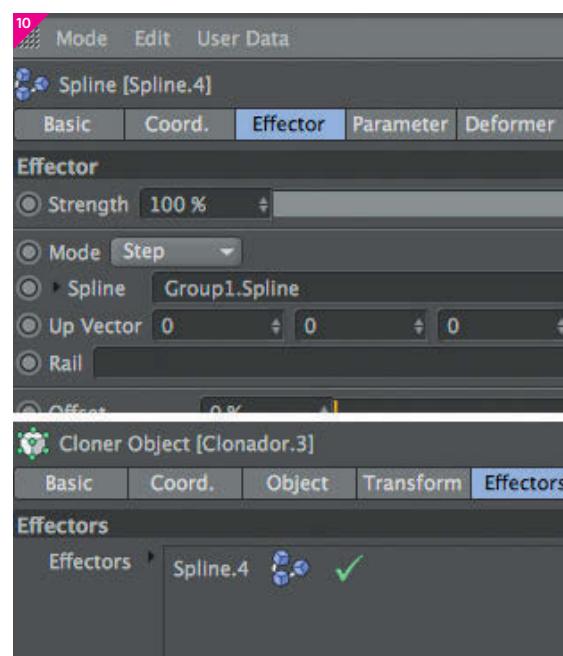
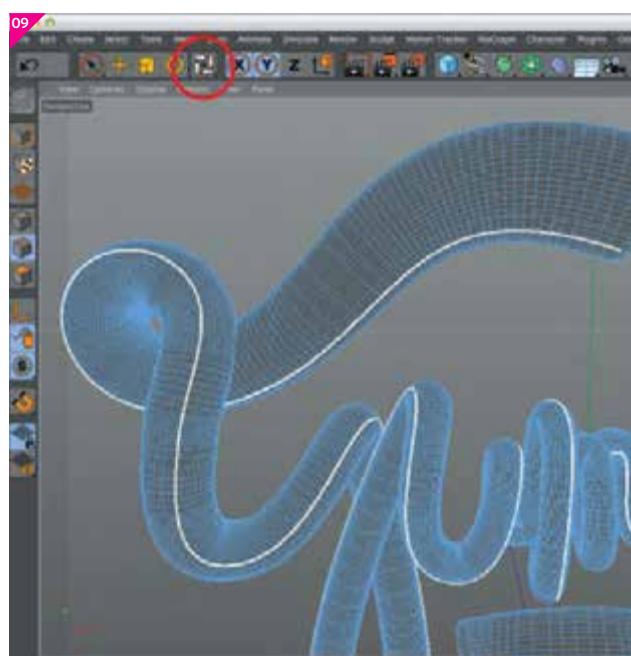
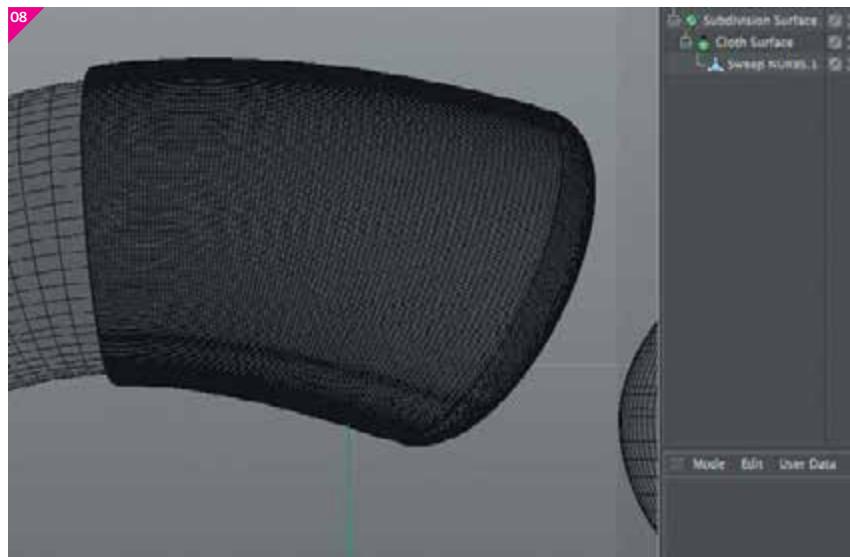
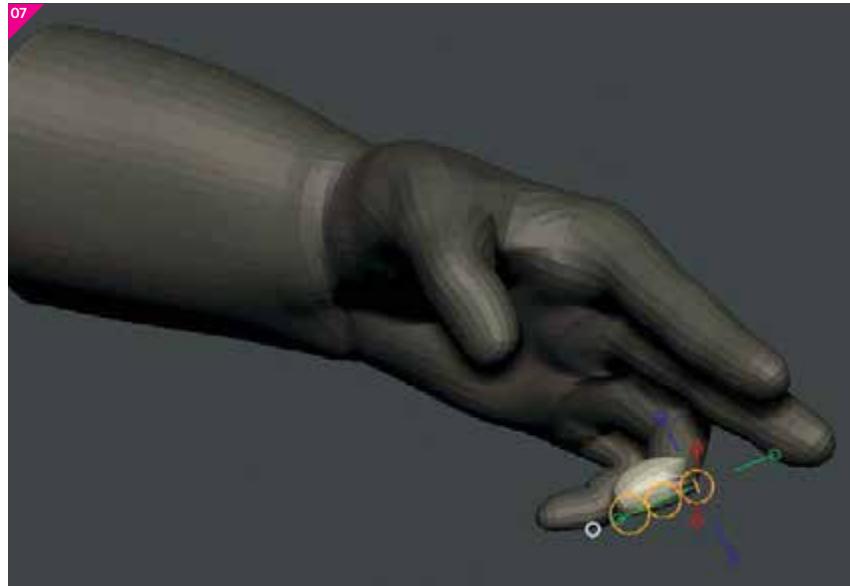
**08 Make the sleeves** To carry out this step, first we are going to make a selection of the part of the arm that we want, and then later on we are going to Ctrl/right-click and press Split. Alternatively, go to Mesh> Commands> Split. When you have the selection separated, you then need to go to Simulate>Cloth – then select Drag under the Cloth system, and add 1-2cm of thickness.

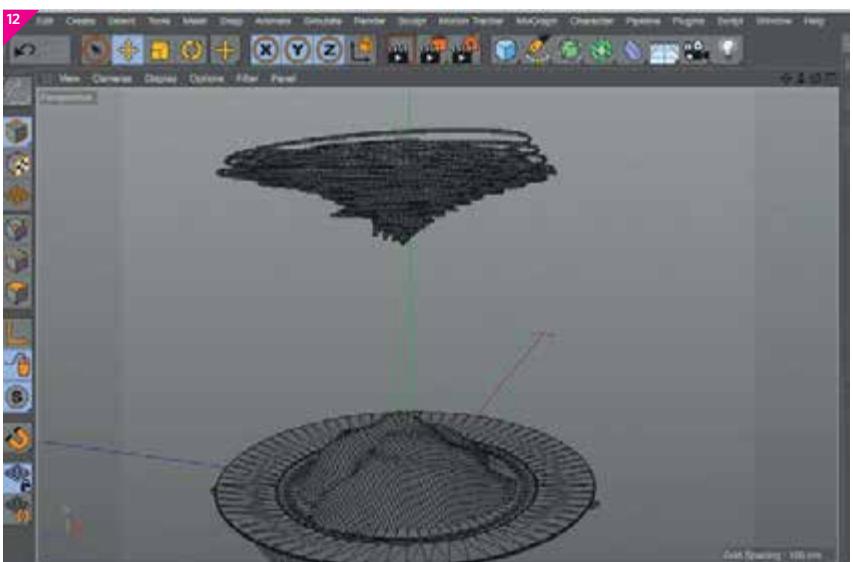
**09 Add the sewing** To make the thread we are going to select the Edge button and use the Select and Loop selection. After selecting the lines that you want to have as the threads, you will need to disconnect them from the model, like a guide. In order to do so, go to Mesh>Command>Edge To Spline. This should pick out the line that you want your stitches to feature on.

**10 Two thread methods** Now that you have separated your guide for the thread, you can do a sweep with it and add a circle. You are going to have a separate mesh so you can have another colour and a combination of textures. The second one is to simulate a real thread, so get a Cloner, get a small capsule and then drag it above the Cloner. Next, go to the MoGraph Effector and select the spline. Add this Effector to the Cloner effects and in the spline Effector attach the spline to it. When using a Cloner it is necessary to set the count to a high value in order for it to look like real thread.

### Keep tweaking

Play with the points of the spline – just try moving it back and forth until you feel that the models look good. A good way to do this is with different camera angles. Go to the right camera angle and take a look at the points from there. If they look aligned it's a good sign!





**11 Make the tomato** Making a good mesh for the tomato is important for the next step. We need to have a good shape where all the spaghetti is going to be around. Make a sphere, and then open the Sculpt tools from Cinema4D and use the Grab tool to deform it until you get the shape you are happy with. Bear in mind that if you need to subdivide the mesh, do it. When you are happy with your mesh go to the Objects panel, Ctrl/right-click the object and press Current State To Object in order to copy your sculpt model into a new one, so that you can delete the last one or hide it.

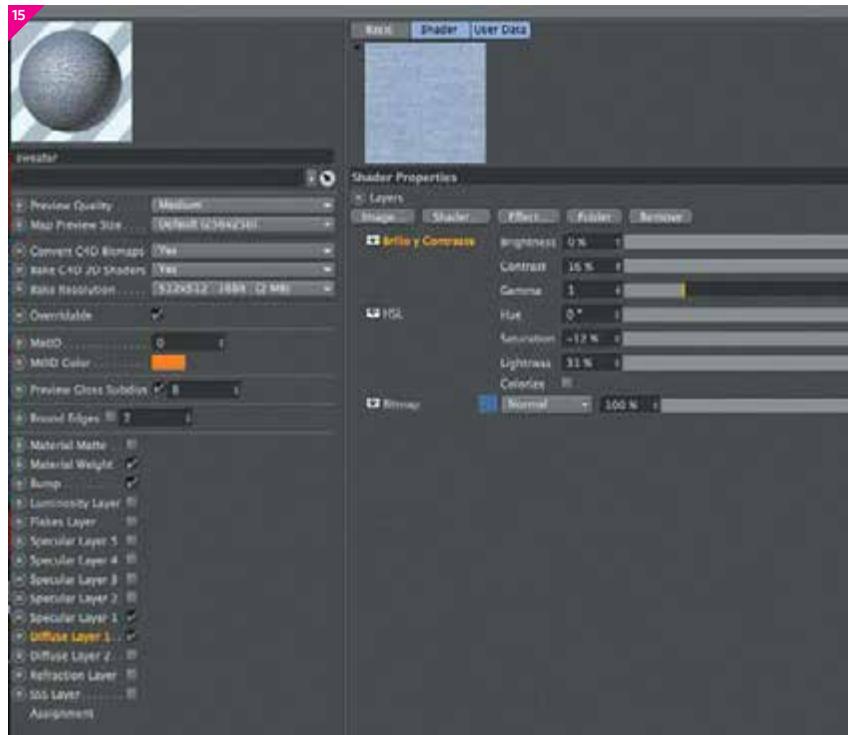
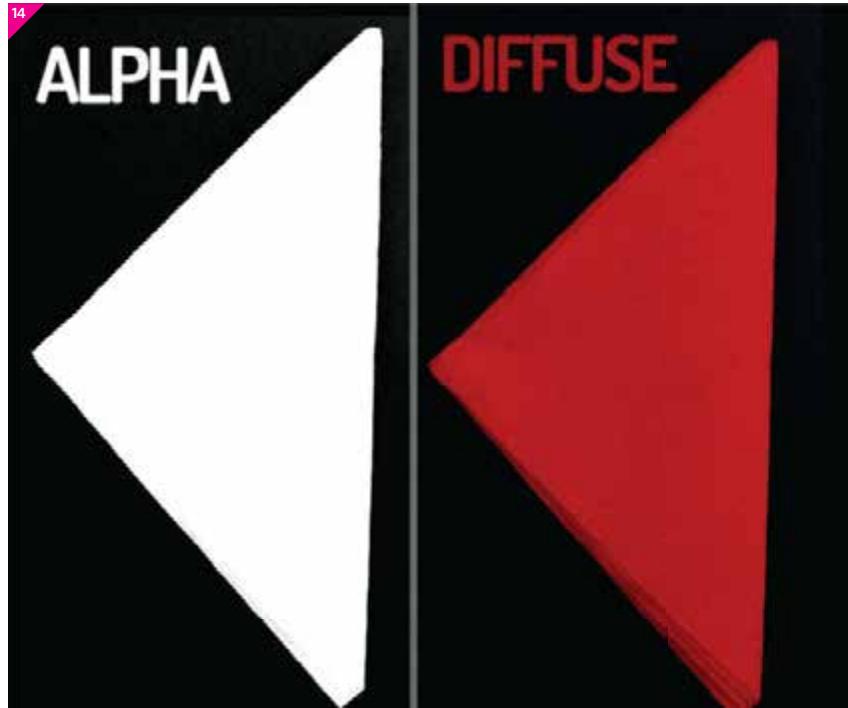
**12 Throw the spaghetti** To mix the spaghetti with the type is not going to be a straightforward process, for as you can see in the image, the spaghetti around the type is making a nice movement around the strokes. What you need to do is to select a helix from the Spline panel and play with the parameters until you get a really messy spiral shape, as you can see in this step's screenshot. After you have made your helix, make it editable. In Type, select B-spline, and in Intermediate Points select Uniform and 8 points. It is now time to add a Spline Dynamics tag to the spline, to add a Collision Hair tag to the objects, and to press Start in the timeline. When the spline is on the top of the tomato, press Stop and delete the tags.

**13 Build the fork** To make this spaghetti we are going to use the Spline Dynamic tag again and use the same techniques as in the previous step with the tomato. The difference here is that the shape is now around the fork when we go to delete the tags. With the new shape of the spaghetti we are going to once again add the Spline tag, go to the Get Tool Point mode, and we will select some of the points that we would like to hold the spaghetti - we would suggest these points to be around the pinches of the forks where the spaghetti clings on. Now, with the points selected in the spline, press the Spline Dynamics tag and go to Properties and select Fixed. Deselect the object, and these points should be purple now. Once again, press Play in the timeline and stop it when you like the shape that it has created. Try this a few times until you get a nice overall look.

### Control the points of the spaghetti

As we mentioned earlier, it's not very straightforward when it comes to making the perfect spaghetti shape, so when you are finally ready with the spaghetti on the top of the tomato, put the type on top of it. Now you'll have to play with the points one by one to put them around the type. It's not hard but takes time, so be patient.

**14 Add the napkin** This is not a model – it's just a photo taken of a kitchen napkin. Using photography is one of the many tricks that designers sometimes choose to use, especially when a photo really matches and fits into a given scene. All we need in order to achieve this is a good Alpha for it, so go to Photoshop and vectorise the napkin, make it white, and make the rest of the scene black. In V-Ray or in another render engine, just put this file like an Alpha and the real napkin as the Diffuse in the shader.



**15 Texture the arms** To make the textures of the arms, you simply need to load a denim texture tile and add a nice Bump for it. In this case for the Bump we used a tiles preset with a very low Global scale. For the sleeves folds we used the same shader, but we did a layer in the Diffuse channel. On top of this, we added the Lighting, Contrast and HSL effects. You might find that setting Contrast at 15% and Saturation at -12% works best, but experiment with it.

# Showcase

## Jenue

Alvaro Matas (aka Jenue) is a Spanish artist and art director who divides his time between Madrid and London. He makes playful images for editorial, music and advertisements with his own colourful view and style. Jenue seeks to go beyond traditional typography, combining CG and real-world elements.



**Pencilsan, 2015**  
Cinema 4D

The love between an ampersand and a pencil culminates in this hybrid transformation, made with Cinema 4D and using a real German pencil as reference.



**Eat Me Now, 2015**  
Cinema 4D

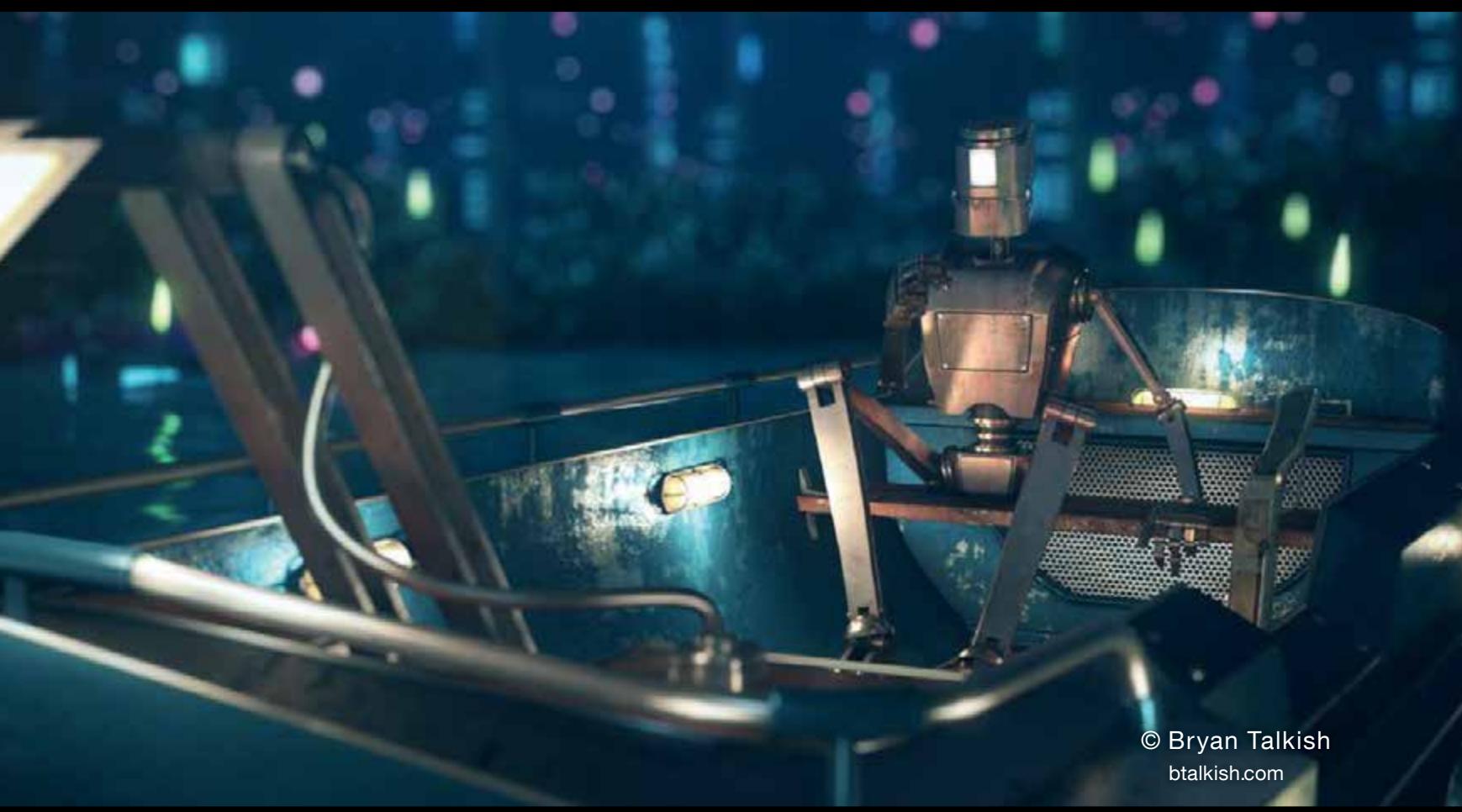
Eat Me Now is a food series where photography and 3D join forces. This piece shows how words and sticky peanut butter can magically come together to entice you eat it now.



**F, 2015**  
MODO, 3ds Max

F is from Alvaro's alphabet made in Plasticine with lots of different shapes and ideas with an unexpected result. This letter was made in a day.

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# Pro shader and rendering techniques in MODO

Render surrealist art in MODO by exploring new techniques

It is always a great challenge to interpret 2D concepts and make a faithful version in 3D, but it's also an extraordinary practice to turn shadows and lights from a pencil artwork into a 3D scene.

One of the most interesting aspects of this tutorial is to see how rewarding it is to bring to life great concepts like this one and increase fine details for your characters and so on.

Another great aspect of this process is to take advantage of the powerful render scheme of MODO and how it handles render passes so you can have precise control of your post-production stage. You can also discover exactly how ZRemesher can easily optimise your meshes for sculpting work and maps productivity.

Great lighting can be achieved in a few steps inside MODO. Not only does it create great light, it's also a powerful tool when it comes to the shading process. Once you master the Shader Tree, you can achieve any result you aim for. MODO is the main tool in my pipeline, simply because it has a very intuitive interface. Tasks become easier when your software UI is clear and neat and that's how it feels working in MODO.

Specific render settings in MODO can boost your final render quality and save plenty of time afterwards in Photoshop. Tweaks and fine adjustments are essential for a better result, so don't skip it!



**DANIEL D'AVILA**

North Pole 3D, 2016

**Software**

MODO, ZBrush, Photoshop

**Learn how to**

- Plan complex 3D scenes
- Interpret 2D artwork in 3D
- Optimise post-production with render passes
- Optimise geometry with ZRemesher
- Texture fine adjustments
- Shade in MODO
- Light in MODO
- Texture in MODO
- Model in MODO
- Adjust colour in Photoshop

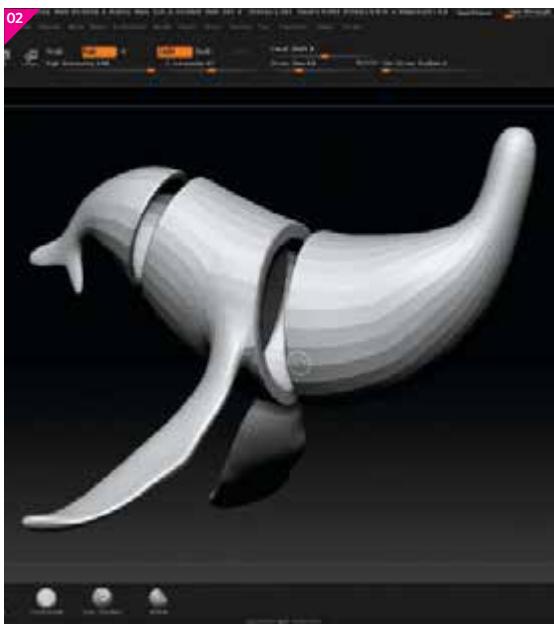
**Concept**

This 3D artwork was based on the original concept of Spanish artist The Dulk, and it's all about surrealism. I find it so inspiring and then it came to me to rebuild the entire scene in 3D with my personal vision of his work.

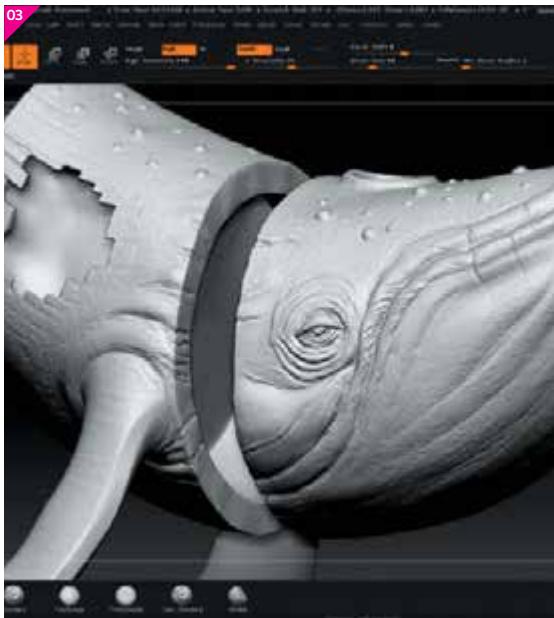


**01 Block primary shapes** The starting point of this artwork begins with blocking the primary shapes of your elements. You can do that simply by observing the overall composition and extracting those shapes in your mind – for example, the whale and its S cylinder movement. Open MODO and create an eight-sided cylinder using the reference image as a backdrop. At this stage it's not necessary to worry about topology issues, since it's just a base mesh of your scene.

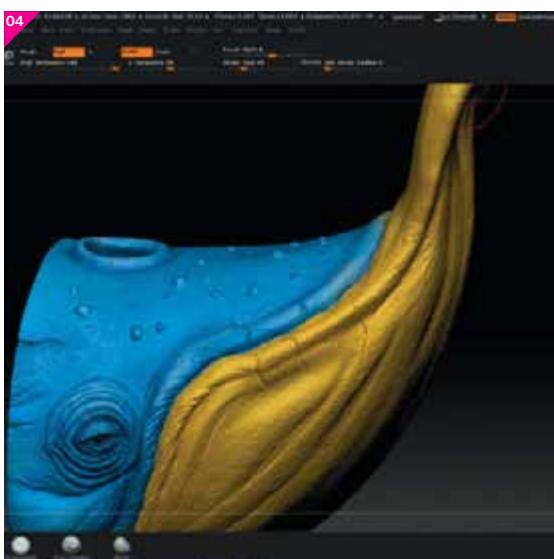
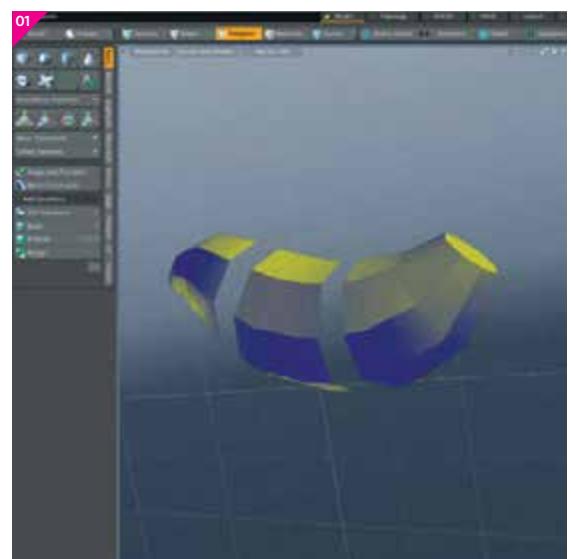
**02 Create the whale base mesh** After exporting the whale OBJ file, import it to ZBrush as a tool and begin to refine its silhouette. Using basically the Move tool and different brush sizes you can achieve pretty good results. If your topology begins to get uneven, it's time to turn your tool into a DynaMesh. Increase your DynaMesh resolution to 32 and while pressing Cmd/Ctrl, click, hold and drag inside the canvas to activate your DynaMesh. Then when you achieve a good blocking result you need to optimise your mesh with ZRemesher. Before that, create some ZRemesher guides with the ZRemesher Guides brush to specify the polygon flow and then let ZRemesher work its magic.



**03 Begin to sculpt** At this point it's a good idea to create UVs, since your data will turn into maps in a further step. Always begin to sculpt rough aspects of the whale, such as the cheek volume and then go on to finer details as you increase the geometry resolution. You can make good use of brushes like Dam\_Standard for the majority of the wrinkles and clay buildup. The last touches of texture are created with Alpha brushes combined with DragRect stroke.



**04 Polypaint and map exporting** As you finish the entire sculpting stage, you'll start to polypaint the model. Select a light-blue colour as a base for the upper side of the whale and a pale yellow for the bottom part. This is where your artistic background can make total difference in enriching details of the whale. Widespread use of masking was used to reinforce occlusion areas and reliefs. Using the Cavity Mask will produce great results to select areas combined with polypaint. At the end of this step, it's time to export all of your maps. Be sure to export your polypaint at the highest geometry subdiv and maps like Normal and Displacement at the lowest values of your geometry subdiv.

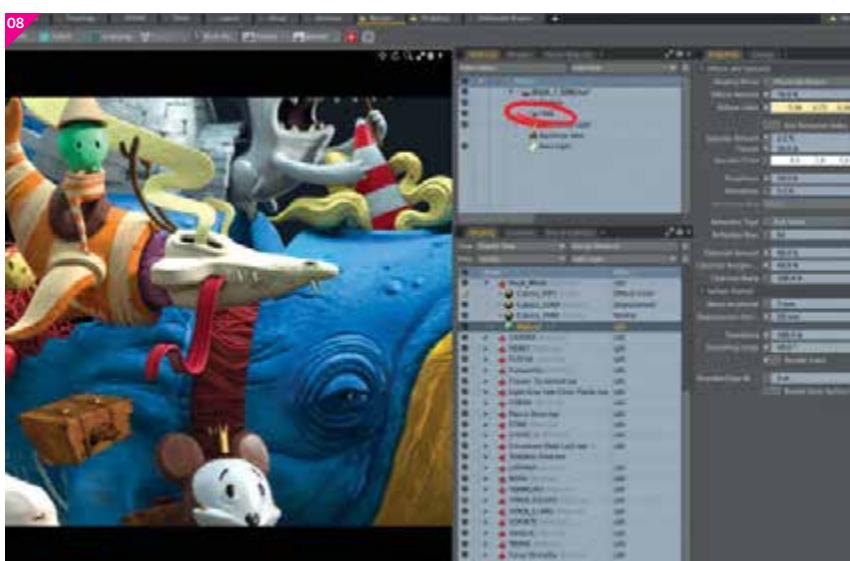


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## Enhance your work

The great thing about reinterpreting a pre-existing 2D concept is the freedom to add your own personal vision and details. It's not simply about working in a literal way since you are practicing new techniques, artistic vision and trying to push your limits. You should add textures that don't exist, but that make sense in terms of enriching your art. Researching references is also a bit of a cliché, but it's an effective way to push your skills further. You can also ask for opinions on specialised forums so that experienced artists can give you their words of wisdom. The more you dedicate yourself, the more you'll evolve. Improving your artistry is an endless pursuit.



**05 Assemble overall positions** You'll need to repeat the previous steps until you get the scene completed. All the elements and characters created in the final render were made with the exact same technique, so it's just a matter of hard work and time. Another important comment about this workflow is also the fact that all the models will remain in the same workspace even before switching between programs like MODO and ZBrush, so make sure you create all the base meshes in the desired positions as precisely as possible.

**06 Light the scene** The simpler, the better – that's an expression that fits perfectly for many lighting setups. Unless you need an specific effect, you can produce beautiful illumination results with just a few light sources. In this case use one directional light as the main light, an HDR image for the environment and an area light from the bottom side as the rim light.

**07 Work with your maps** The next step is to take care of all the maps you've created in ZBrush and import them in to MODO. You'll need to do a few tweaks in some of them in order to produce the correct results in the render. In the case of Normal maps, select the map in the Shader Tree, go to the tab image still and set the Colorspace to Linear instead of None. In the Texture Locator tab set the Vertical Wrap to -1, so it will flip the vertical to suit the map correctly in the UV. In the case of Diffuse maps you can play with gamma values to balance the contrast and saturation of the map.

**08 Shade in MODO** Before starting the shading work in MODO, lock the position of your main camera for security purposes so you don't offset the position accidentally. Duplicate your original camera and use it as a free camera, so you can pan around and focus on closer spots of your model. Watch the Preview window refresh the results. The use of a physically-based (BRDF) material can produce great results with a richer texture. Duplicate your Diffuse map and drive it as a Subsurface Color map, which will give the effect of translucency that can be seen in most of the characters, such as the friendly penguins in front of the whale.

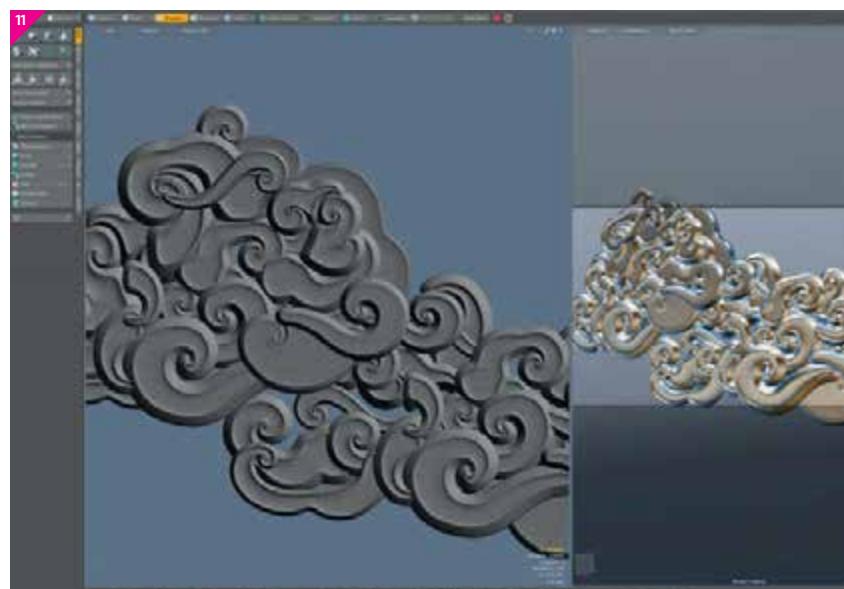
**09 Create render passes** Once the scene is ready we can move on to the Render Settings and Render Output adjustments. One of my favourite features of MODO is the ability to select many different Render Outputs in a variety of situations. It will allow you to diagnose specific issues or give you huge amounts of control over compositing in Photoshop. A default scene automatically includes a Final Color and Alpha output, which should be fine for most situations. Additional layers can be added from within the Shader Tree viewport itself simply by clicking the Add Layer option of the full viewport window, and selecting Render Output>Render Output from the pop-up menu.

**10 Render the final scene** Now, before starting the final render you should quickly adjust your Global Illumination settings. Boost your Light Bounces up to 3. This will prevent noise issues in the darker areas of your scene and also provide a more vivid final result. Select your image resolution inside the Frame tab. In this case the values are 6,000 pixels wide by 3,850 pixels tall. Once you've done all this, press the F9 key or go to Render>Render. The Render window should open and begin to calculate the irradiance cache pre-passes. Go grab a cup of coffee and wait until the render is finished.

**11 Design cartoon clouds** After the render is complete you can add clouds around the scene in order to give the composition some balance. In fact, this is a good opportunity to use some modern and cartoon cloud designs rather than traditional, as it would fit perfectly in this surreal scene. After a few studies the clouds were concluded and ready to render separately. You can now open Photoshop and start to have fun with the post-production stage. When you're placing the clouds in the scene, you might find that their design is a little too distracting, so it might be worth adding in a blur or tweaking the opacity of the cloud layers. The clouds can be placed in the scene to suggest perspective and depth, so feel free to position them in different spots of your image. This is where your work will gain more life and interest.

**12 Make use of render outputs** This is where you'll feel thankful about having multiple layered render outputs in MODO. It becomes pretty handy to select areas with the help of Surface ID, or controlling shadow areas with a Shadow Density pass in Photoshop. As you get more and more familiar with each one of these render outputs you'll find yourself addicted to this workflow since they give huge control to lights, shadows, reflections, specularity, roughness and so on. It is also time to play around with different background colours, and it can be a such a challenge in such a colourful palette. The pink-orange solution combined with subtle light invasions really worked for this scene.

**13 Final retouches and colour adjustments** At this point, the last colour adjustments are added. Try to compare your rough render with your final retouched image to see how rewarding and important is to master Photoshop techniques. Add a Vibrance adjustment layer and increase the saturation of your image. You can also use a soft brush with a low opacity and paint a few interventions of pink and orange over the elements to simulate light and color bouncing. Add some fog, dust, speckles and particle effects above all layers but do not exaggerate it. It's simply a matter of using your artistic skills and abilities to balance colour and contrasts.



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James Brady

[artstation.com/artist/jamesbrady](http://artstation.com/artist/jamesbrady)



James is a games artist working at The Creative Assembly, aspiring to become one of the best artists in the industry

### UNREAL ENGINE



### Blender

Sean Kennedy

[openvisualfx.com](http://openvisualfx.com)



Sean is a compositor and generalist currently employed at CoSA VFX, having previously worked at other studios

### 3ds Max

Vikrant Dalal

[project01studio.blogspot.in](http://project01studio.blogspot.in)



Vikrant has several years of experience in VFX. His company Project01 Design produces 3D tutorials

## Achieve atmospheric lighting in Unreal Engine

This tutorial will guide you through creating realistic lighting within Unreal Engine 4, starting from adding basic lighting all the way to adding post-processing effects and using the Reflection Capture system to realistically capture the lighting reflections in your Unreal Engine scene. We will be taking you through the creative process for a *Silent Hill* homage scene, which stormed videogame press worldwide after it was released online. You will discover what is involved in creating realistic lighting within a game engine, along with the theory of lighting while using PBR materials and in a mainstream game engine that supports PBR rendering.

**01 Prepare your project** Before diving into a project, it's crucial that you are confident in knowing what you want to create and what the end goal is for your project. This will end up saving a lot of time scrubbing for references, having to reshape your project on the fly if you ultimately opt to change your final result, and overall saves a lot of time and frustration. Once you've gathered enough reference and have a solid mood board, then we can move on to the blocking stage.

**02 Block out your scene** Once your end goal is clear and you are confident in what you are trying to achieve, it's time to start the creation process. This is the easiest stage in creating an environment and helps to get you into the correct frame of mind mentally before starting to add detail into your scene. You can quickly scrub together a block out by using Unreal Engine's primitive geometry. This can be found on the left-hand side of the editor. This also quickly allows you to decide on which angle or aspect of your block out composition works for your scene.

**03 Add lights to your scene** Once you're happy with the block out, you can then move on to lighting the scene. This not only provides you composition, but it means you can also quickly see how materials and assets look when imported to the scene. For this project, when we initially approached lighting the *Silent Hill*-style scene, we were clear on the atmosphere we were trying to achieve, enabling us to have a solid idea on how the scene should be lit. Start by adding a directional light and a few low-lit light points. Lighting plays a huge role in how believable your environment looks and feels.



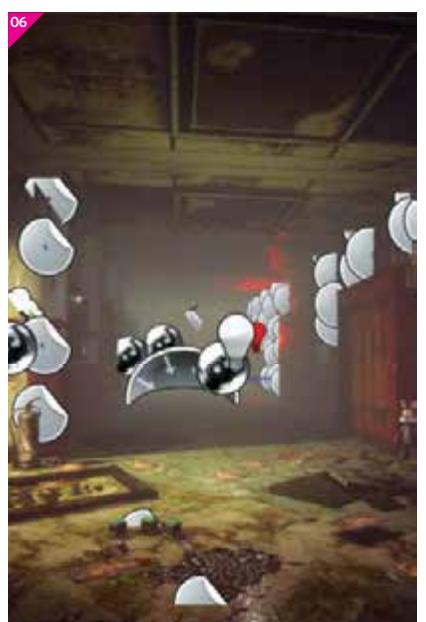
- UE4 scene files
- Tutorial screenshots

**“**Remember that when creating assets for a game engine, TRIS count is very important **”**

**04 Achieve a chilling atmosphere** Once the lighting is set up in your scene and you're happy with how it not only looks but feels, it's time to then move on to nailing the atmosphere you are trying to portray. You can achieve this by using Unreal Engine's Exponential Height Fog, which allows you to quickly create a chilling atmospheric composition while also leading the viewer's eye. Start by adjusting the overall fog density followed by adjusting the overall fog opacity. You can also use directional in-scattering, which helps to blend the fog with the scene's lighting setup.

**05 Include your materials/assets** Once you're content with the overall lighting and atmospheric setup, you should then begin to replace the overall block out with modular wall, floor and roof sections, followed by the assets that were created for the scene. It's important to remember that when creating assets for a game engine, TRIS count is very important. Always remember that any assets in a scene that do not move – such as static meshes – should always be optimised. You can achieve this by deleting polygon faces that are not visible to the player. This saves TRIS count and overall UV texturing space.

**06 Capture environment reflections** This stage is a crucial part of the environment creation process. This stage allows you to achieve realistic reflections within an environment and it also helps the game engine calculate how the glossy reflections should appear within the environment. In technical terms, the Reflection Capture actor provides indirect specular. We get direct specular through analytical lighting, but that provides reflections in a few bright directions. Indirect specular allows all parts of the scene to reflect on all other parts, which is important when you feature materials like metal that have no diffuse response and rely solely on secularity when using PBR shaders.



### Bake Light maps using Lightmass

Unreal Engine's Lightmass creates Light maps with complex light interactions like area shadowing and diffuse interrelation. It is used to pre-compute portions of the lighting contribution of lights with stationary and static mobility. This enables great optimisation and allows your scene to run a smoother frame rate. This is very important for game environments and also helps to decrease the time it takes to render a screenshot for your personal site. Remember, it's very important to make sure a Lightmass importance volume is in your scene at all times. This means Lightmass bakes light that is only contained within it.

### 07 Post-process your scene

This stage is always my favourite part of the environment creation process.

Adding post-processing to your scene enables you to tweak the overall look and feel. Examples include HDR blooming, ambient occlusion and colour tone mapping. In Unreal Engine 4, the post-processing volume is essentially only a type of blend layer that enables you to blend different effects on top of your scene. The post-processing volume also acts as a linear interpolation, which enables you to blend this with actors, such as a camera, when creating cinematic sequences.

### 08 Render images of your final scene

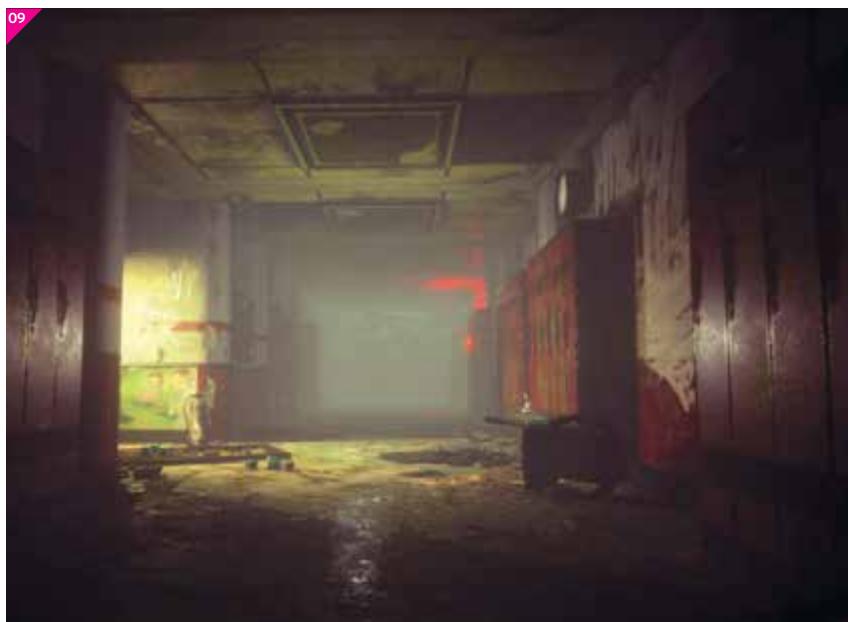
Once we've completed the environment process and are happy with the final product, we then need to move on to taking screenshots of the environment. One trick that I find speeds up the process is to add cameras to the scene to avoid situations of losing that perfect composition shot. This can be done by selecting All Classics on the left-hand side of the editor and dragging a camera actor into the scene. Once you drag a camera actor into the scene, a small box will appear outputting what that camera is rendering.

### 09 Add any final touch-ups in Photoshop

The final process is touching up the environment screenshots in Photoshop. Start by adding a Sharpen filter to really make the scene pop. Depending on how you're trying to lead the viewer's eye, you could start by adding a gradient overlay to focus the viewer on a specific area of the scene – this also helps to exaggerate the lighting within the scene. Follow up by adjusting the overall tone, contrast and brightness to finalise your result.

#### Lead the eye

When creating an environment, it's important to provide a focus of the scene to the viewer. This can be achieved through a number of techniques, which enable you to draw the eye into a focal point within the environment. This also applies to the lighting composition setup too. When creating the *Silent Hill* homage scene, you can achieve this by brightening a focal point of the scene while pushing the rest into the background. Pulling back on any detail from the unfocused section of the scene allows the viewer's eyes the opportunity to rest on the focal point.



# CREATE THE IMPOSSIBLE

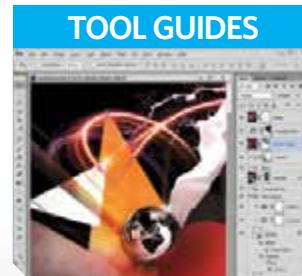
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## BLENDER

# Matchmove a scene for compositing

Set extensions are the kind of visual effect that every single movie released today has. Not just the big blockbusters, but comedies, little indie dramas and even just about every TV show has some type of set extension or background enhancement happening in it. It can be anything from alien landscapes and futuristic buildings to simply replacing a traffic sign or a storefront. Usually the same techniques are also useful if you want to remove something from a scene, like a wayward crew member or a car driving through the background of your medieval village.

While set extension tasks can be accomplished using both 2D and 3D techniques, in this tutorial we're going to focus on 2.5D to add an important exterior location to our shot. Perhaps the actual location was a protected park, and we were not allowed to build any kinds of structure out there during shooting. If the interior scenes are all shot on a soundstage or another location, then we only need a couple of establishing exterior shots, which is where matte painting and set extensions can save the day. And if you've not heard of 2.5D, it is exactly what it sounds like - a blend of 2D and 3D. We'll use 2D cards with matte paintings on them and position them around our 3D space.

We are going to utilise Blender's 3D space for much of this project, but keep in mind that the work we are doing is set up

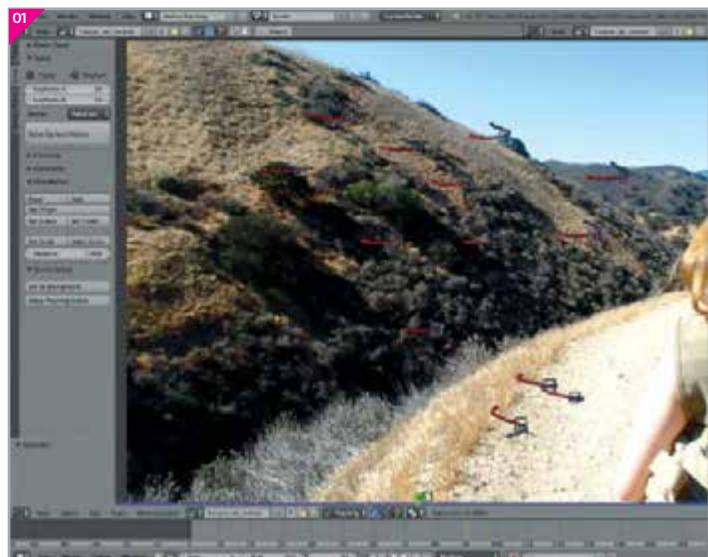
for compositing, not a 3D render. Matte painting, which isn't the scope of this tutorial, goes hand in hand with set extensions. Matte paintings are usually given to a compositor in layers so the compositor can make adjustments to (or completely remove) each individual part of the painting and layer them into the matchmoved scene as needed. These layers can range from very simple (as in our case with this tutorial) to very complex.

Do not rule out 3D completely, though. Naturally, you are welcome to create any 3D elements you want. Having the matchmove will make it relatively easy to drop things into place, but be sure to take great care when texturing and lighting. Look at light and shadow placements in the footage, and the overall tonality of the shot, and do your best to get your 3D in the same visual world.

**01 3D track the scene** Bring the footage into the Movie Clip Editor (MCE), then Set Scene Frames and Prefetch so it's loaded into memory. This is a simple shot, so there should be no problems finding at least eight points to track. Try and select points that are both close and far from the camera. I tracked 16 different points, finding contrast areas on the hillside and the pathway. In this project I tried to stay away from the very edges of the image.

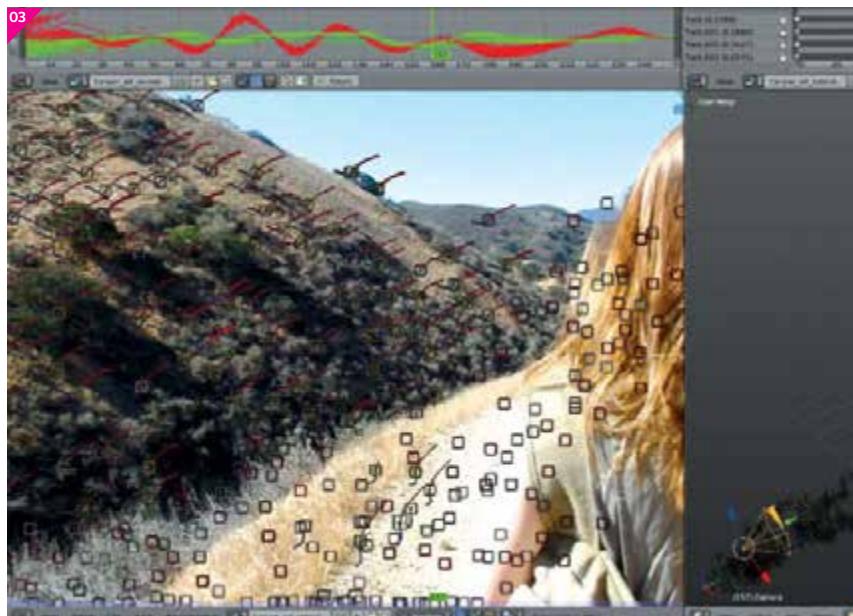
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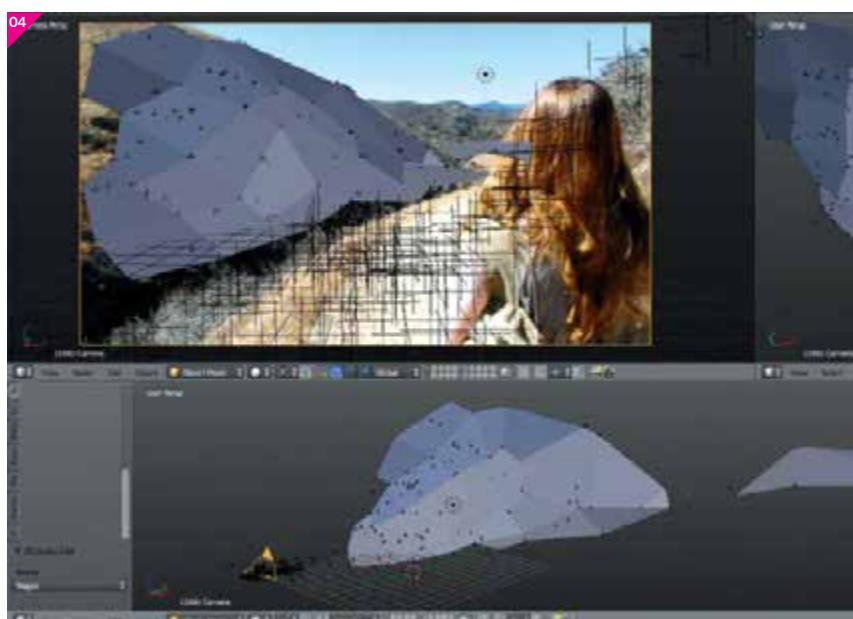
### Zero-weighted tracks

Zero-weighted tracks are track points that do not affect the camera solve. By leaving the original 16 track points weighted to 1, the camera solve should remain the same, but these new zero-weighted track points will populate the scene in their correct places and basically give us a 3D outline of the landscape. We can then place vertices at each of these points automatically, which lets you easily re-create basic geometry that matches the landscape in the footage.



**02 Solve the camera motion** After choosing Solve keyframes and setting Refine to Focal Length, K1, K2, my 16 points generated an error of 0.3. In the Scene Setup tab, press Set as Background, so Blender automatically places the frame sequence in your camera view, then click Setup Tracking Scene. There are some buttons in the MCE editor for aligning the orientation, but I usually find it just as easy to select the camera, set the pivot to the 3D cursor (at centre), and rotate in the various views until it is aligned properly to the world.

**03 Zero-weighted tracks** Having only 16 points makes it tough to get an idea of the geometry of the scene, so let's use zero-weighted tracks to create many more. In the MCE, under the Track Settings tab, open Extra Settings and change the weight to 0. Go to the first frame and use Detect Features. Press F6 to bring up the options and change the threshold and margin until you have tons of tracks all over the shot. Track forward, then do the same from the last frame, tracking backwards. In the MCE graph editor, select the most erroneous curves and delete them.



**04 Create rough geometry** Solve the camera again, and your 3D scene should now look like a point cloud of the landscape. In the Geometry tab, press 3D Markers To Mesh. In the 3D view, you'll see a vertex created for every track point. Turn off the track points by unchecking Motion Tracking in the Properties panel. Create geometry from the new vertices by going into Edit Mode, selecting four vertices, and pressing 'F' to create a face. Keep building new faces off that one, choosing vertices that seem to make sense for the hillside.

**05 Bring in matte paintings**

In File>User Preferences>Add-Ons, turn on Import Images as Planes (which you'll now find under Shift+A>Mesh and begin importing your matte painting elements. In this case, we're using PNG images with alpha channels. When importing, be sure to use an Emission material and Use Alpha - Premultiplied. Place and scale them as necessary. Be sure to place the planes near vertices that lie in 3D space where that matte painted element should actually be.

**06 Spice up the sky**

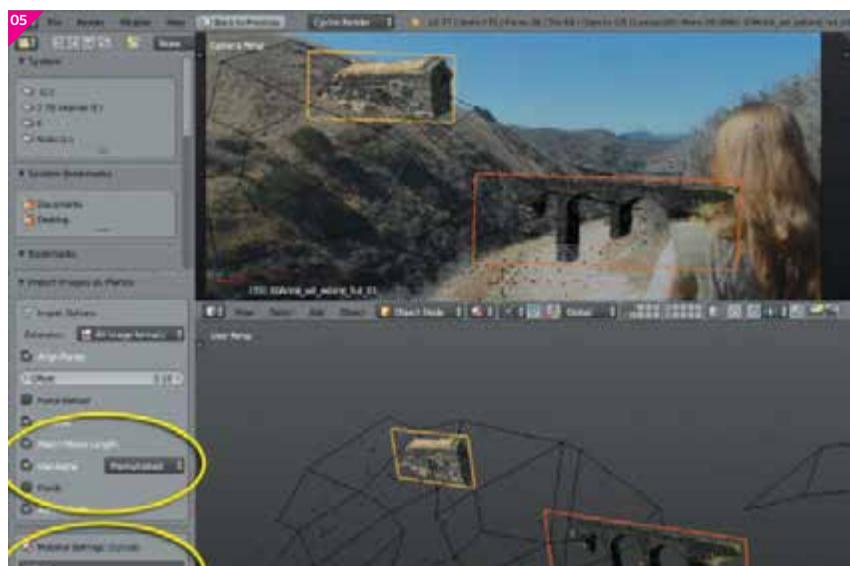
The sky was clear on the day of shooting, but we can add some drama by replacing it or adding clouds to it. Import a sky image as a plane and make it very large. Push it back away from the camera, beyond the farthest track point. We don't need a real sky dome because all the elements have light painted in to them from the matte painting department. This sky will be just another layer we composite in.

**07 Arrange the layers**

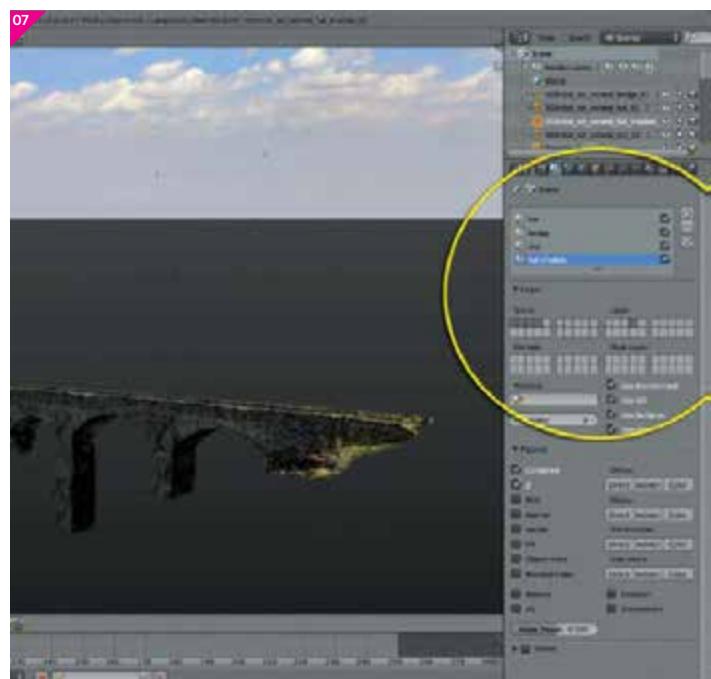
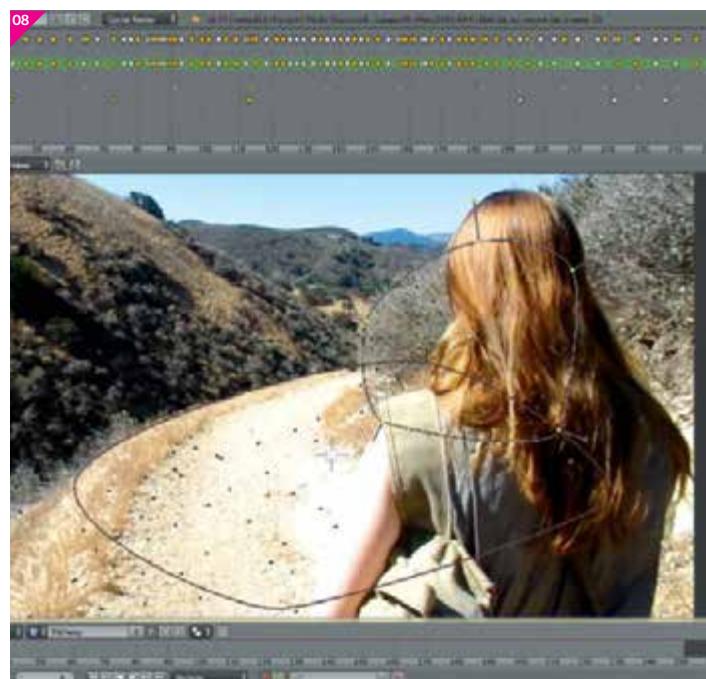
We have to split these paintings into the correct layers for compositing. For this particular scene, we could leave the hut and the bridge on the same render layer, but if we want to colour correct only one of them later, it will be easier if we just place everything on its own layer. Once you have split objects onto their own layers by pressing 'M', you then have to set up the corresponding render layers in the Render Layers panel. Place the rough landscape geometry on a layer that won't render.

**08 Rotoscope foreground objects**

Obviously we've got to bring the actor and some of the pathway back over the matte paintings. Back in the MCE Tracking Properties, turn off the checkboxes for Pattern and Disabled, to keep the view less cluttered. Press Tab to switch into Mask mode and Cmd/Ctrl-left click to begin drawing your first mask around the actor's hair, pressing 'I' to set keyframes. As you create the masks, be sure to label your mask layers clearly. I'm creating one mask for the actor and one for the pathway in front of the bridge. And don't forget you can parent masks to tracks!

**Rotoscoping keyframes**

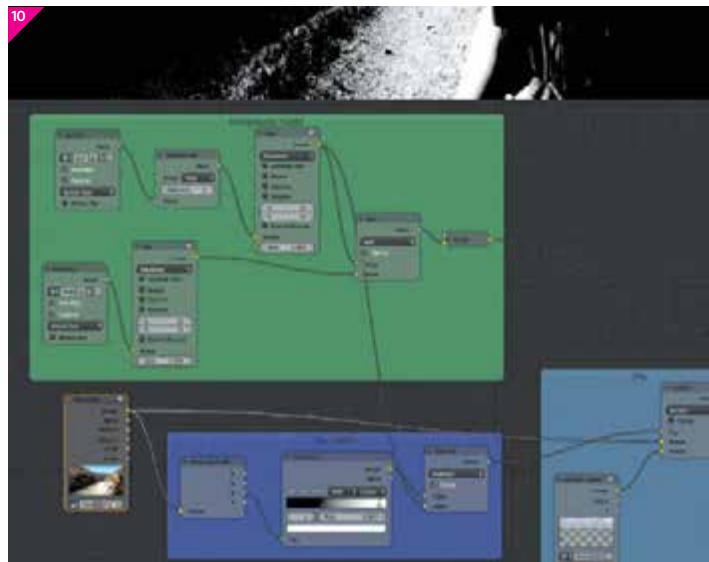
When rotoscoping, by default, Blender does not set a keyframe on your mask. Once you draw your mask, press 'I' to set a keyframe, and then we recommend turning on the Automatic Keyframe Insertion button. Now, when you adjust your mask, it will automatically set the keyframe. It's also worth opening a dope sheet and setting it to Mask, so you can see those keyframes on a timeline. Be careful to turn off Automatic Keyframe Insertion when you go back to your 3D view, or you'll be setting random keyframes every time you move a plane!

**07****08**



### Projecting onto geometry

We're only using flat images here, but it's also very easy to project those flat images onto basic geometry to give a bit of real 3D depth to the matte paintings. My preferred method of doing this is by UV unwrapping the simple geometry using the Project From View option. Then simply move the UV vertices around the matte painted image to place them precisely, and your matte painting is now mapped on. Alternatively, you could use the UV Project modifier. Each way has its own pros and cons.



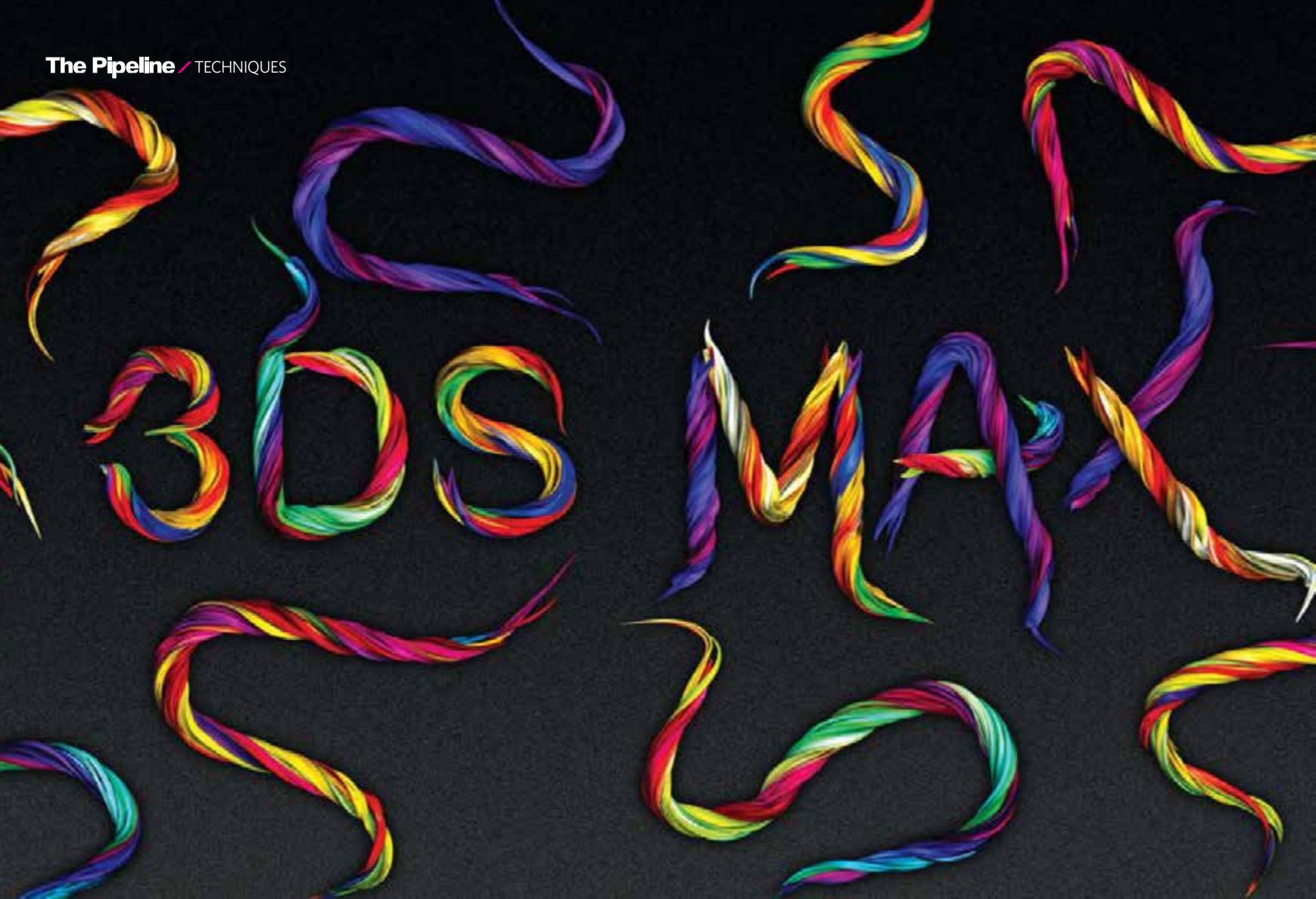
**09 Moving to the compositor** Once in the compositor, Enable Nodes should already be activated because setting up the tracking scene creates a basic node layout for render layers and shadow passes. Delete whatever you won't need, duplicate the Render Layers node for every layer you set up in Step 7 and layer them so the sky is first (using a Mix node set to Screen), followed by the bridge, hut, and hut shadow (all using Alpha Over nodes). Create Mask nodes for your rotoscoping, combine them with a Math node set to Add (enable Clamp), and plug it into the factor of the Alpha Over node for the bridge.

**10 Adjust alpha channels** You'll have to invert the matte on the bridge, and add a Blur to each mask before they are combined. You could also use a Dilate/Erode node if your roto isn't accurate enough once blurred. For the sky, run a Separate RGBA node off the Movie Clip node and plug a Color Ramp into the blue channel. Experiment with adjusting the sliders until you get a nice matte for the sky, then subtract the actor's hair roto with a Math node. In order to get the perfect clouds, you'll need to plug that Math node into the sky Mix factor.

**11 Add 3D elements** Now let's dip into real 3D to bring in some added realistic details. I chose to make a bird flying in the background, which I rendered from a separate project file to use as an alpha channel on a 2D card in our main scene. Other fun details could be a clothes line hanging outside with fabric blowing in the breeze, or maybe some added trees or bushes. You could even shoot an actor against a greenscreen and place that footage on a 2D card out there in front of the hut, if you liked.



**12 Finalise the shot** Now that all the elements are there and layered correctly, feel free to dial things in to your liking. Maybe add some light wrap to the hut, and make sure the colour correction is working on all the individual elements. Check your black levels and brightness levels by making the composite overly bright or overly dark temporarily (throw a Color Correction node at the end of the node tree and crank up the Gamma). If you're using footage from a camera that has noticeable film grain, you'll have to add matching grain to your matte painted elements.



**3DS MAX, AFTER EFFECTS**

# Render your own text motion graphics

There are many different types of text effects, from movie titles and company logo animations to simple presentation text animations or any kind of video trailer text. With all these effects around, it means that you can try various different methods, but in this tutorial we are going to create motion graphics text, which you could use in a video trailer or as a 3D cartoon logo.

First of all, we will introduce the idea of a text effect. You may have seen these kind of effects on the internet, like on YouTube or on Vimeo. There are a number of 2D and 3D apps and plugins that people choose to use for motion graphics, including 3ds Max, Cinema4D, After Effects and so on, but we are going to use 3ds Max to achieve this effect.

Before you start working on this kind of effect, you should have good knowledge of 3ds Max as well as different modifiers and options within this software, because sometimes it's the simple modifiers that yield the best results.

You might not be able to learn each and every parameter of this software, as 3ds Max is very vast and will need a lot of time to go through. As far as the motion graphics effect is

concerned, we will learn as much as required for this particular tutorial.

This is very interesting subject because you can't rely on one certain process to create this effect. As much as you will use your creativity and tools, you'll find different effects every time you experiment. With this in mind, the kind of results you'll get will very much depend on your own understanding of using tools and techniques.

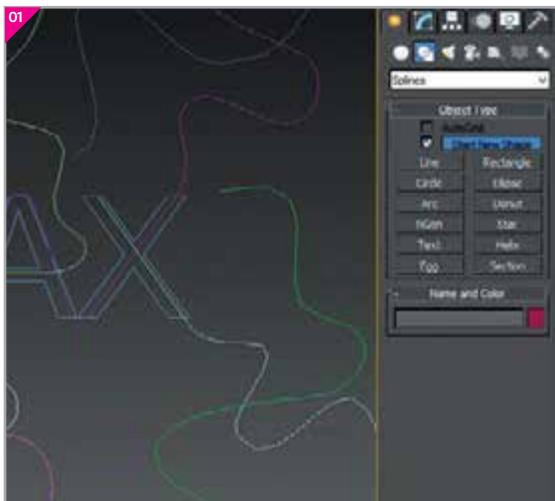
**01 Create spline shapes** Open 3ds Max. Before we start working on our scene, remember that we are going to create text motion graphics using both splines and geometry. First of all we will create our chosen word or text using Spline shapes. To do so, go to the Create panel and go to Shapes>Spline>Text. Now using a Line shape, draw a shape for this text or word. Refer to the image for better understanding. After you've finished the text shape, you'll want to create surrounding shapes using a spline so it will add a more dynamic look as well as adding depth to the scene if you create these shapes in all three axes.

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## 01 Make sure you use references

Always watch different videos on the internet for a better understanding of text animation. It helps to know what different artists use and which tools help to make their results more attractive and dynamic. It helps a lot. You should use this tip for other things as well.



**02 Create geometry** As soon as you've finished with the initial shape modelling, it's time to create an object or geometry that will travel along these shapes or on splines. We will need to create a Geosphere. For that, go to the Create panel and select Geometry>Standard Primitives>Geosphere. Now add some modifiers to it. First add Noise modifier and set the Scale as 2.3, Strength X as 5.0, Y as 5.0 and Z as 5.0. Now add a TurboSmooth modifier and set Iterations to 2. Next, we will add our last modifier, which is Path Deform Binding, which we will use to animate this Geosphere on a spline.

**03 Animate geometry on spline shape** To animate our geometry or object on the spline shape, we will use a Path Deform Binding modifier. Add this modifier and first of all click on the Move To Path button. We will need to change the parameters, but before that, remember we have to animate them too. Go to Frame 0 and set the Percent to 0.0, Stretch to 10, Rotation to 0.0 and Twist to 2000. Next, turn on the Auto Key and go to Frame 100 or your last frame. Now set the Percent to 100 or change it as per your requirement. Stretch should be set to 12.5, with Rotation to 360 and Twist to 2000. Make the same objects or geometries for all our splines and animate them as you need to.

**04 Assign materials** Now that we have finished the modelling and animation part, it's time to work on the look of our geometry. For that we will use a standard material. You could use a V-Ray material, but as you can see this effect doesn't need any advanced material, so a simple material is probably better. First of all select one Geosphere and assign a standard material, then set the Specular level to 20, Glossiness to 30 and Self Illumination to 25. There is no need to change the colour because we are going to use colourful maps for this. Assign different materials for all the Geospheres, or you can select bunch of Geospheres and create a group, assigning a single material for that group.



## Try different plugins

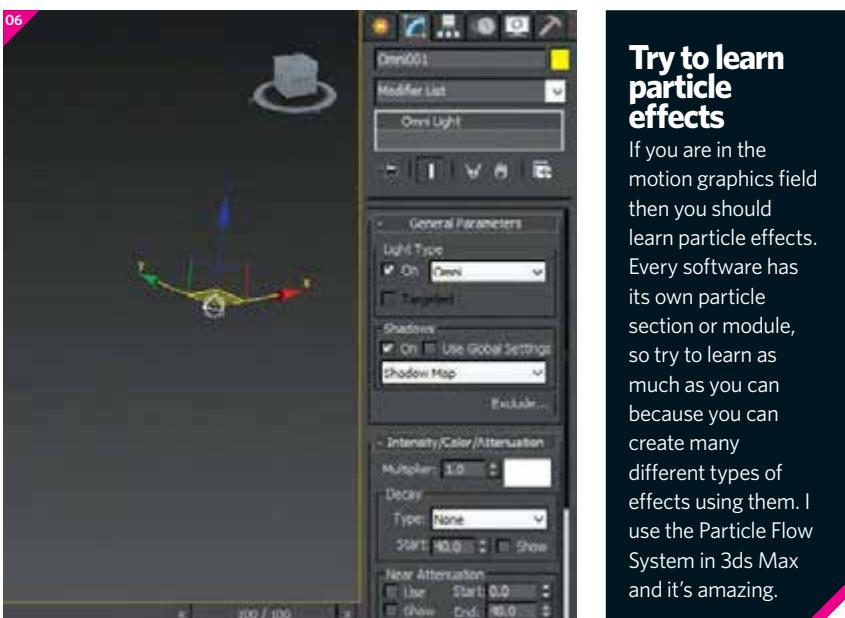
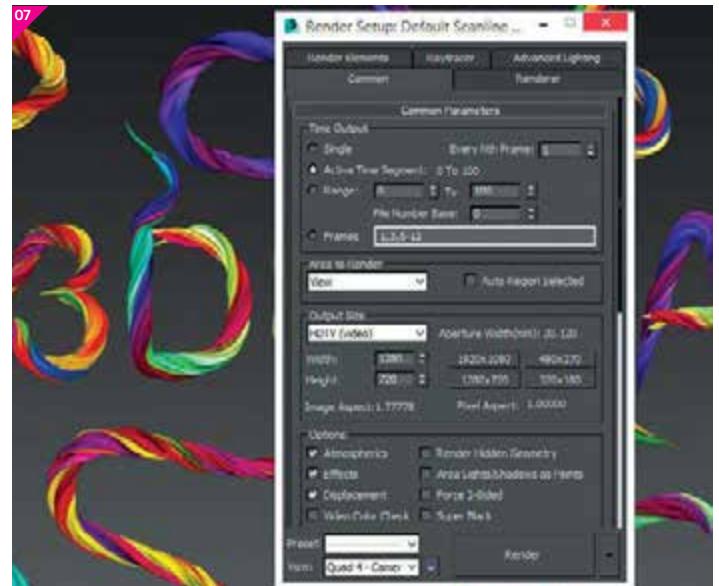
If you have good knowledge of different plugins for 3ds Max, for example FumeFX, RayFire and so on, you can use these to improve your motion graphics effects. These mean that you can add fire and smoke or break the text and so on. You can use RealFlow software to create liquid effects in your animation, so it will look more amazing and dynamic.

**05 Assign a texture** Now we have created the material for our Geospheres, it's time to work on texture for our geometries. For that we will use colourful images of textures. All you need to do is create colourful textures in Photoshop or just download them from the internet. After this, just add these images as a material and assign them to your different geometry. Because of these colourful images these Geospheres will look very attractive.

**06 Light it up** After finishing the initial setup, it's time to add light in the scene. We will create a single light, which is Omni – for this, go to the Create panel, and go to Lights>Standard>Omni. Click on Omni Light and create it in the viewport. Set this light position as per the camera and scene requirement. Now select the lights and go to the Modify panel, then turn on the Shadow and make it a Shadow map. Don't change anything in Light Multiplier and Light Colour. You can add more than one light if you think that the scene needs it, but otherwise keep it single to save on rendering time.

**07 Render** After finishing the lighting setup, it's finally time to render the scene. Go to Render Setup by clicking F10 and set the Output Range, Output Resolution and Output Path. After finishing this setup, if you want to render different passes, for example a Diffuse pass, Light pass or a Reflection pass and so on, just go to the Render Elements tab and click on the Add button. Here you can see the new window has appeared, so select the elements that you want to render and click OK. Now just hit the Render button. It will take around one to two hours to finish the rendering.

**08 Composite and add final tweaks** Once the render has finally finished, import the renders into After Effects or any other compositing software that you use. We're using After Effects, so import the elements and then drag them into the timeline. Now select Element and add Brightness and Contrast or any other effects, then play around with the parameters until you get a final result that you're satisfied with. Then create a solid background in Photoshop and import that background into After Effects as well. Drag it to the timeline below the Text Element. Now make the final output and you will get your motion graphics text.



### Try to learn particle effects

If you are in the motion graphics field then you should learn particle effects. Every software has its own particle section or module, so try to learn as much as you can because you can create many different types of effects using them. I use the Particle Flow System in 3ds Max and it's amazing.



# Technique focus

Incredible 3D artists take us behind their artwork



**Jake Denham**  
luxuryvisuals.com

**3DArtist** Online username  
Jaked3d

**Software** 3ds Max, V-Ray,  
Photoshop  
**Goosefoot**,  
2015

**LIGHTING** To light the environment I used an HDR image plugged into the Texture slot of a V-Ray Light and set it to Dome. Ticking Lock To Dome Orientation means that when you rotate the light in the viewport the HDR rotates too. Once I was happy with that I put a few V-Ray IES lights into the interiors and the lighting was good to go.



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# NVIDIA GeForce GTX 1080

What does the Pascal architecture in NVIDIA's newest generation of GeForce cards mean for 3D design?

**A**s a rule, we tend not to cover gaming cards. While the technology behind GeForce and Quadro cards is pretty much identical, a Quadro is the go-to choice for professionals for all sorts of reasons.

But the GeForce GTX 1080 and new Pascal architecture shake things up so much that it's incredibly tempting to consider it as an alternative to a Quadro. It's notable for being manufactured on a 16nm process, shrunk from the 28nm that has been the same for multiple generations of graphics cards. Smaller transistors means more rendering hardware in the same space, and the potential for performance improvements.

NVIDIA has squeezed 2,560 CUDA cores into the GP104 core of the GeForce GTX 1080. This is more than the Quadro M5000 and GeForce GTX 980, but fewer than the M6000 or GTX 980 Ti. It uses 8GB of GDDR5X memory, a higher bandwidth version of GDDR5, and this gives it a bump in memory bandwidth. Core clock speed has seen a big jump to 1,733 MHz, up from 1,202 MHz in the GeForce GTX 980 and 1,050MHz in the Quadro M5000. Overall performance, in terms of GFLOP/sec, is almost double both of these cards. An outstanding generational improvement.

In games, the GTX 1080 comfortably outperforms pretty much everything else on the market, in some cases by a staggering margin. At 1080p, the differences are truly extraordinary, although the demands of gaming at 4K resolution slightly narrow the new card's advantage.

Physically, the card has changed a bit too. While the layout and features of retail cards will differ depending on the manufacturer, NVIDIA's reference 'Founders Edition' card uses just a single power connector (older GeForce cards usually need two, while Quadros use one).

There's a striking new silver casing surrounding the cooling fan, it has a backplate and at the back, a DisplayPort 1.4 connector. This will allow the use of 4K displays with refresh rates of 144Hz or higher, significant for gamers (and possibly the artists who work on those games) who want those fast frame rates at 4K resolution.

It supports some of NVIDIA's latest standards. CUDA 8 is most useful, with its

support for unified memory. Just before we went to press, NVIDIA announced a new range of 16nm Pascal cards, the Quadro P6000 and P5000, along with the Pascal Titan X, all of which exist on a higher pricing tier than the GTX 1080 but should support the same new APIs.

So back to the original question: what about using a GeForce GTX 1080 for professional 3D design? You lose a few things Quadros have to offer: certified drivers and ECC memory are two examples, and the clock and memory speeds differ. One advantage of gaming cards was always lower pricing than Quadros, getting more graphics hardware (more CUDA cores, and often more memory) for a lower price.

But the GeForce GTX 1080 is significantly more expensive than its predecessors. At £619 it's no longer a particularly cheaper option, and we expect the Quadro P4000 to occupy a roughly similar pricing tier. We're also yet to see pricing and performance information for AMD's competing Radeon PRO professional GPUs.

We tested under similar conditions as in our Quadro reviews, albeit with a more mid-range Core-i5 CPU and we had mixed results. In some of the tests, the GeForce GTX 1080 storms ahead. In SPECViewPerf, the (Direct-X based) Showcase-01 self-shadow result of 112 is the highest we've ever recorded by a huge margin.

But SPECViewPerf is based on a number of different rendering tools, and not all the results were so good. The Maya score was barely more than what NVIDIA's Quadro K620 could muster.

This situation is nothing new. Gaming cards have always worked superbly in some 3D tests but then fallen down in others, and despite its unquestionable raw power, it seems the GeForce GTX 1080 is no exception. It depends greatly on application optimisation, and it still seems some software simply doesn't run as fast on GeForce cards as it does on Quadros.

OpenCL and CUDA performance is significantly improved. In Luxmark 3.1 we recorded a score of 13,000 points, besting the M5000 by 30 per cent. In Arionbench, the CUDA result of 2,632 is higher than even the Quadro M6000.

**“Core clock speed has seen a big jump to 1,733 MHz”**



It's safe to say that GPU-accelerated software (such as Adobe products) will see a serious performance boost from the GeForce GTX 1080. We also ran tests using Redshift, from a company that makes a big deal out of its support for gaming cards. The software has just been updated to support CUDA 8 so worked just fine with the GeForce GTX 1080.

It's clear that NVIDIA has knocked the ball out of the park with its Pascal architecture. It's a huge improvement over Maxwell and it really shows in games. But GeForce cards are always a bit of a mixed bag for 3D design software, and our results show the GTX 1080 falling down in a few areas where the software hasn't been optimised.

If anything, it has whetted our appetite for the Pascal-based Quadro cards. Simply put, if both 3D design and gaming are of equal importance to you, the benefits of the GeForce GTX 1080 make it a no-brainer purchase. But for non-gamers and those who demand guaranteed all-round performance in all 3D design software, we suggest waiting for the next-generation Quadro cards.

**Orestis Bastounis**





**MAIN** The silver casing around the GeForce GTX 1080 looks really good

**BOTTOM LEFT** DisplayPort 1.4 connectors mean support for 4K displays with 144Hz refresh rates

**LEFT** It's a beast of a gaming card, but it's not quite so clearly ahead with all 3D design software

**BOTTOM RIGHT** The shrink to 16nm has brought a big performance improvement

**BELOW** This reference design is the sleekest Nvidia has ever come up with, including the backplate



## Essential info

Price	£619
Website	<a href="http://geforce.co.uk">geforce.co.uk</a>
Cuda cores	2,560
Boost clock	1700MHz
Boost clock relative	1.4x
Frame buffer	8GB GDDR5X memory
Memory speed	10GB/s

## Summary

★★★★★	Features
★★★★★	Performance
★★★★★	Design
★★★★★	Value for money

## Verdict

Strong scores in certain tests were surprising, but don't expect the GTX 1080 to dethrone professional cards

# Maya 2017

Autodesk has only recently released 2016 Ext 2, so what else is on offer in the latest version of the animation tool?

During installation you'll notice that the recently acquired Arnold Renderer by Solid Angle has been introduced as the preferred out-of-the-box rendering solution for Maya 2017. Once installed, its activated via the `mtoa.mll` plug-in. Somewhat controversially, Arnold for Maya is limited to foreground rendering only. For batch rendering in the Maya interface or command line and scaled rendering with a render farm you'll have to make the additional purchase of Arnold licences or the renders will be watermarked. Aside from a few uses, such as creating demo reels or for verifying render output as a proof before sending to a cloud render service, having watermarked renders is, frankly, a major impediment.

For mental ray users, the most significant change is that Autodesk has abruptly ceased to include licences for NVIDIA's renderer. If your pipeline relies on mental ray this will likely be a shock and a strong reason for delaying adoption of this release. NVIDIA is continuing development of mental ray and although it's not available yet, it is scheduled for late-September and there's a promising beta program operating via its website that users can subscribe to. An accelerating trend of gradual decline with decreasing competitiveness and a shrinking user base has helped bring about the change, and not replacing the renderer with a fully-fledged alternative is a bold decision against the backdrop of subscription-only sales.

Other new features and tools include Workspaces, a brand-new clip-based non-linear Time Editor, real-time interactive hair grooming (in XGen), Bifrost Ocean Simulation System (BOSS), Qt version 5.6.1, PySide version 2.0 and augmentations for 2016 Ext 1 and 2 features including MASH and the Render System setup. The introduction of Workspaces brings presets for frequent tasks, such as modelling, sculpting, UV editing, rigging and animation. It's helpful, especially when getting to grips with new menus and editors that you may initially shy away from in favour of more familiar methods.

The Time Editor lets you import keyframe animation, mocap, FBX Multi Take from

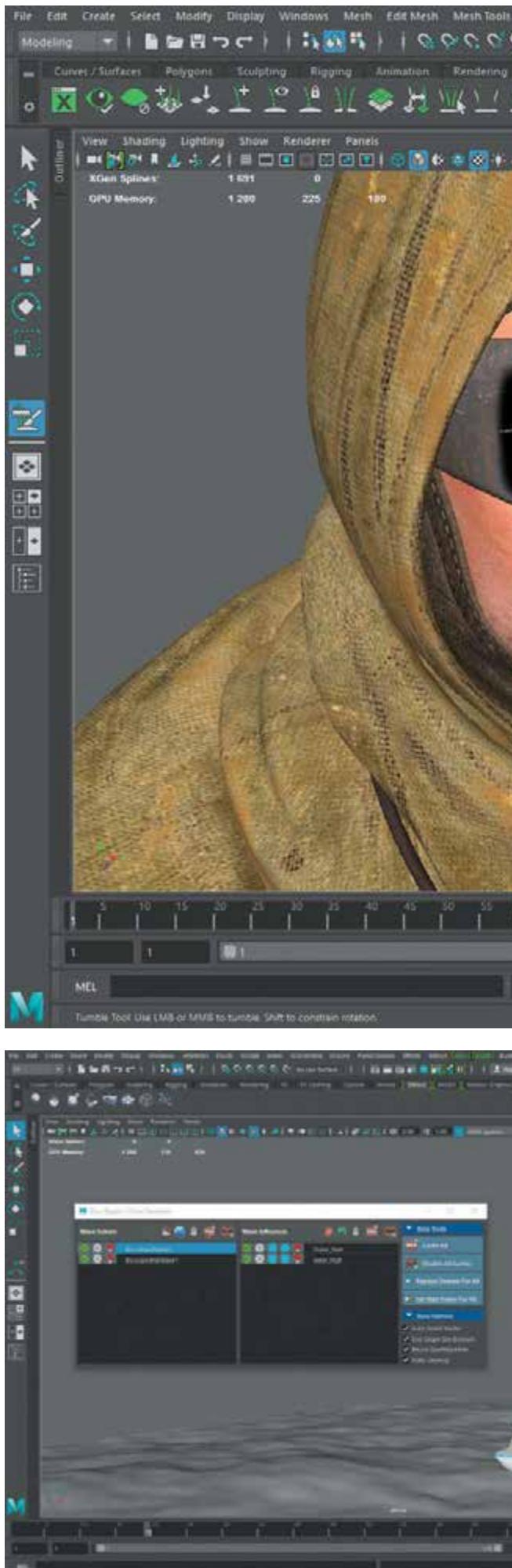
characters, cameras, as well as separate audio that then become clips on tracks. These clips can be layered, reused, blended, grouped, scaled, split and moved between characters. Very artist friendly, the Time Editor is similar in scope to Softimage's Animation Mixer and spells the demise of the more cumbersome Trax Editor. The Graph Editor has received an optional makeover with the Timeline repositioned at the top and a more contrasted environment. Being an important tool, the classic Graph Editor is thankfully still available if you prefer it how it was.

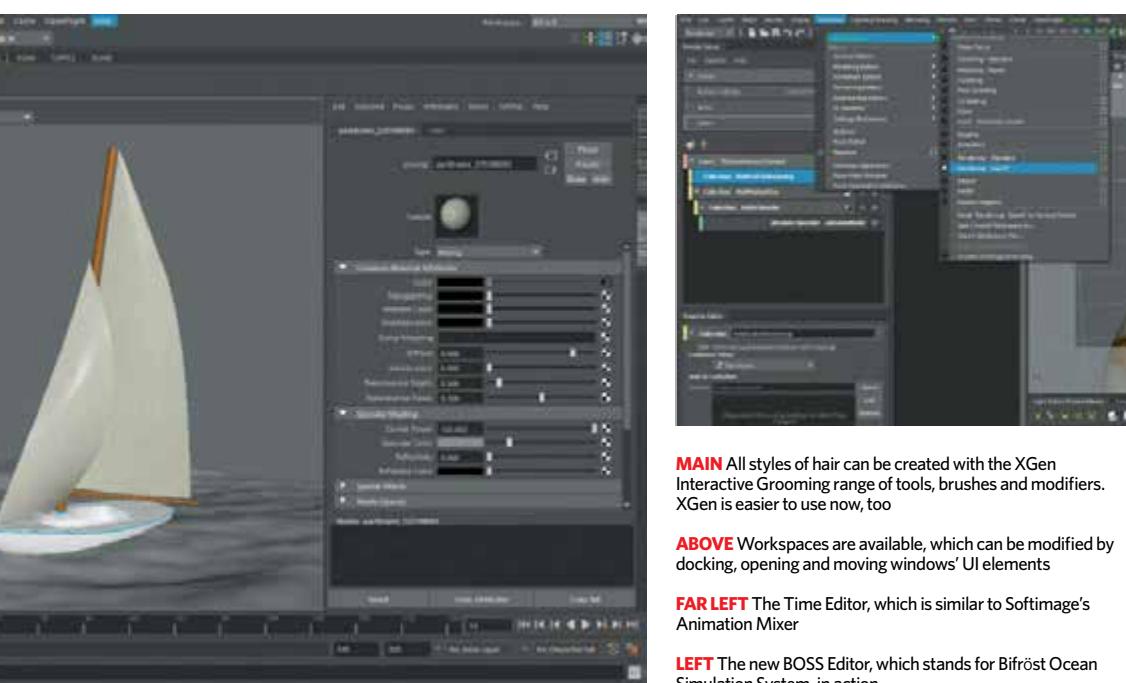
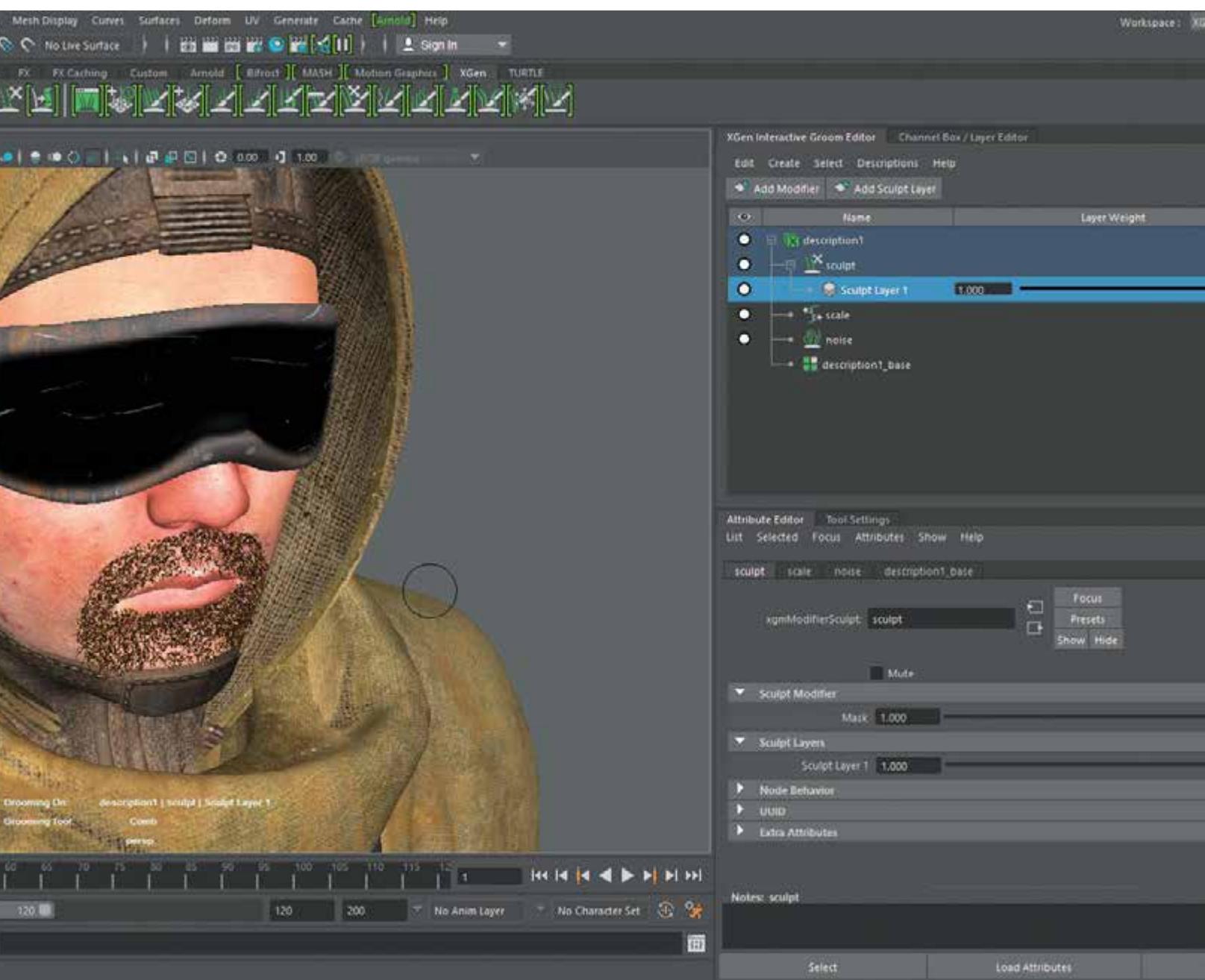
Styling fur and hair in XGen is easier with the inclusion of a new interactive GPU brush-based toolset. An initial attempt at grooming a Wookie asset ended badly, but there were no noticeable delays with a large density of long splines. After subsequent attempts at getting used to the Groom Editor and controlling splines with a less ambitious goal, refinements became easier. Modifiers can help by adding effects like noise and displacement for finalising a more natural groom. Hair is saved to either scene files or Alembic-based cache files.

The BOSS Editor is the hub for setting up Bifrost's Ocean Simulation System. It's as easy as choosing geometry and assigning it as a solver or influence and adjusting parameters as desired. It is resource-demanding, so using the cache for BOSS solvers is wise. Unfortunately, when adding an Ocean Shader Maya instantly crashed every time, and overall it's worth mentioning there do seem to be more bugs than usual introduced with this release, with some interface bugs requiring a complete reboot to fix.

**Paul Champion**

**“For mental ray users, the most significant change is that Autodesk has abruptly ceased to include licences for NVIDIA's renderer”**





**MAIN** All styles of hair can be created with the XGen Interactive Grooming range of tools, brushes and modifiers. XGen is easier to use now, too

**ABOVE** Workspaces are available, which can be modified by docking, opening and moving windows' UI elements

**FAR LEFT** The Time Editor, which is similar to Softimage's Animation Mixer

**LEFT** The new BOSS Editor, which stands for Bifrost Ocean Simulation System, in action

## Essential info

**Price** Subscription Only  
 Monthly £186 / \$185 / €242  
 1 Year £1,500 / \$1,470 / €1,936  
 2 Year £2,850 / \$2,795 / €3,679  
 3 Year £4,050 / \$3,970 / €5,228

**OS** Windows, Linux, Mac OS X  
**CPU** 64-bit Intel or AMD multi-core processor  
**HDD** 4GB free  
**RAM** 8GB minimum (16GB recommended)

## Summary

- ★ ★ ★ ★ ★ **Features**
- ★ ★ ★ ★ ★ **Performance**
- ★ ★ ★ ★ ★ **Design**
- ★ ★ ★ ★ ★ **Value for money**

## Verdict

Worth a look if your pipeline doesn't rely on mental ray or you own Arnold licences

# Redshift 2.0

Redshift 2.0 comes with enhanced subsurface scattering capabilities next to realistic volumetric rendering

**P**BR Rendering is what a lot of artists are talking about nowadays when it comes to professional production rendering. With this in mind, it's clear that we needed to put Redshift 2.0's PBR capabilities through their paces. This is especially important with the Houdini plugin, as it's present in most professional production pipelines around the world. We also wanted to check if the myth is still true that it is not that easy to produce high-quality renders in no time at all.

During our review, we chose to work with a modern car that features a mix of physically plausible results and artistic touches.

The installation process is quite easy. For the Houdini plugin, however, it was necessary to add some lines in the Environment Variables file. After that Houdini gets a new Redshift shelf containing Redshift lights, materials and corresponding nodes in the Tool menus. Next to informative options you will find Redshift lights and two great functions that add Redshift-specific options to Houdini's camera objects and Houdini OBJ geometry nodes.

Worth noting is the fact that the PBR material system can be utilised. To access the materials, it's necessary to create a SHOP network in the main geometry node. Within the SHOP network you can investigate to see what Redshift offers in terms of material presets in the Redshift sub-menu. There are actually presets for the most common looks, including car paint, hair, skin, SSS and a glow material, followed by two material builders and a volume material.

At first we took a preset – the car paint shader – and modified the values to create a matte plastic film-like look. The material was split up into four different layers, which allowed us to create a matte look with a slightly flaky effect. Each layer of the material has its own samples count. For the important layers we kept 32 samples. Simply by playing with the Glossiness we could quickly

achieve this matte effect. In addition, we could deactivate unnecessary layers by putting down the weight to zero.

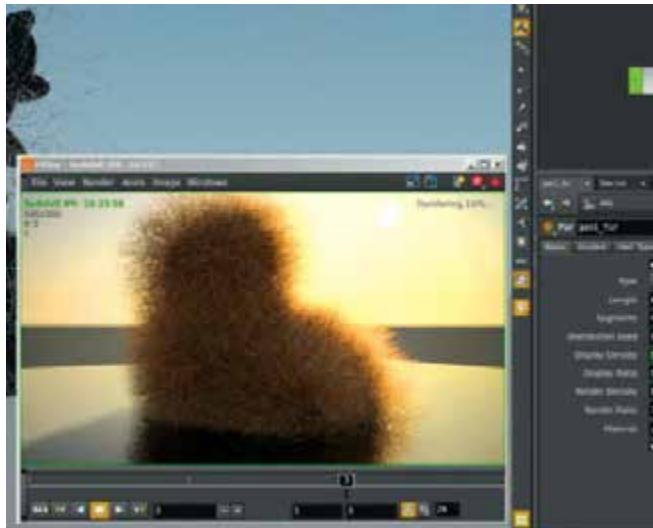
The material presets are easy to understand and to modify, but we wanted to check something else. Houdini is well known for having VOP (VEX operator) material builders. Redshift offered us the possibility to create a Redshift material builder so that we could tailor our own material presets according to our needs. We just created Redshift networks for all necessary materials, starting from glass up to rubber, in our SHOP and in there we could access all mathematical functions and texture sampler functions from Redshift.

For the tyres we used an SSS VOP node combined with procedural dirt generators to change our scatter colour to achieve a worn-out look. With a decreased scatter scale it's quite easy to create a realistic rubber effect with a fair amount of nodes. For chrome and plastic effects we used the RS material preset, which provides the possibility to choose pre-defined setups – a great time-saver if that's important to you.

The rendering process was straightforward. In the ROP context we created a Redshift node, which allowed us to define our render attributes. Even IPR was possible in alpha stage, which was handy because we could see on the fly.

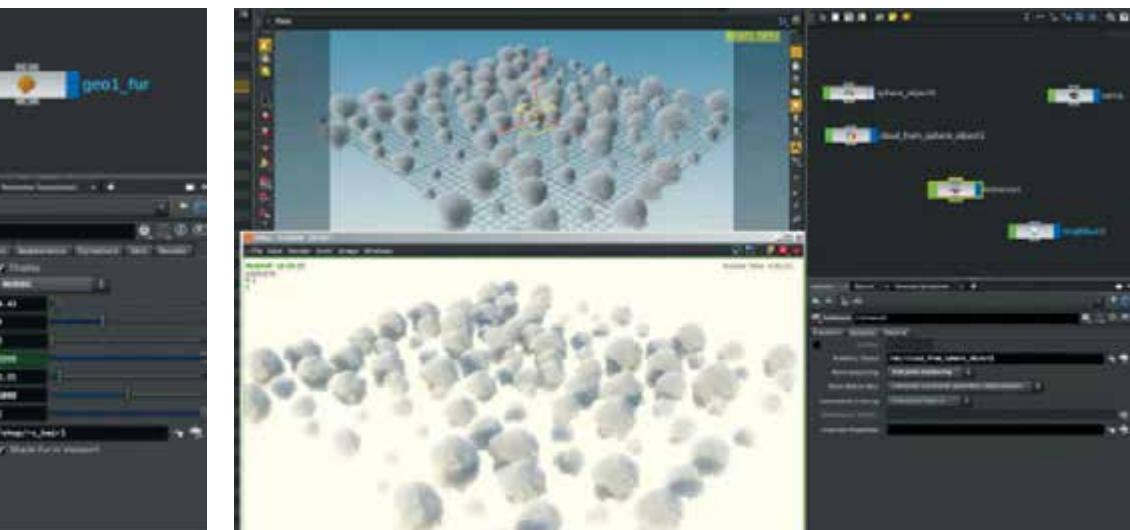
A really important factor that should be mentioned as well is the area of scalability. Besides the Houdini integration, which is in the alpha stage, there are already plug-ins available for 3ds Max, Maya and Softimage. Alongside these, Redshift has announced that a Cinema 4D plugin is already in development. After the official release of the Cinema 4D plugin, Redshift will be an exceptional competitor to many of the current state-of-the-art rendering engines.

**Rainer Duda**





“Besides Houdini integration, there are already plugins available for 3ds Max, Maya and Softimage”

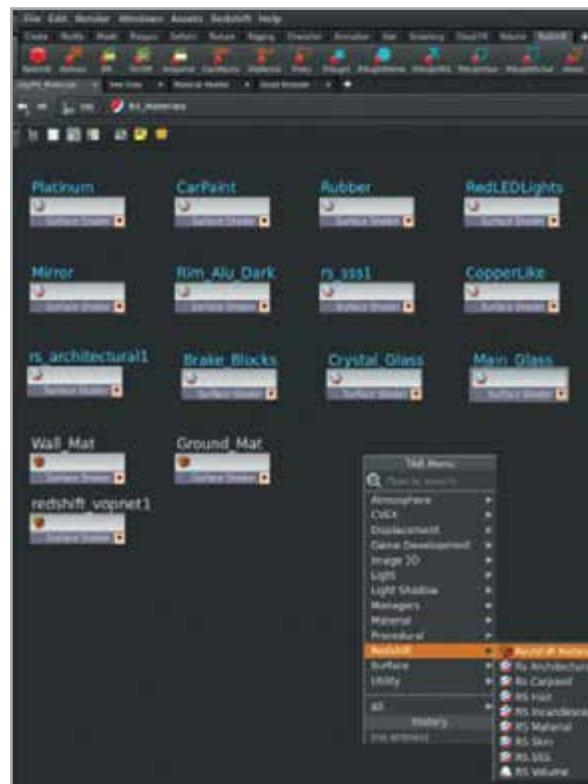


**MAIN** Redshift 2.0's PBR capabilities enable physically plausible results, including artist-friendly control structures

**BOTTOM MIDDLE** Another great feature is the rendering support of hair and fur

**BOTTOM RIGHT** The Redshift plugin can render OpenVDBs files and Houdini native volumes with Redshift's volume capabilities

**BELOW** Redshift's IES lights give artists great flexibility in creating rich environments besides physically plausible materials



## Essential info

**Price** Starting at £380 / \$500 including one year maintenance

**Website** [www.redshift3d.com](http://www.redshift3d.com)

**OS** Windows XP or newer (64-bit only), Linux (glibc 2.12 or newer)

**GPU** NVIDIA graphics card with at least CUDA compute capability 2.0 and 1GB VRAM

**CPU** Intel Core i5 and up

**Houdini** 14, 15, 15.5

## Summary

★★★★★	Features
★★★★★	Performance
★★★★★	Design
★★★★★	Value for money

## Verdict

The Redshift 2.0 GPU renderer is evolving into a fast and reliable rendering solution for professional production environments



# Technique focus

Incredible 3D artists take us behind their artwork

**TEXTURING** My objective was to create the right textures for a underwater scene. I increased the diffuse contribution in the materials trying to limit the reflections and bright elements. The caustic effect was hand drawn in Photoshop and applied to the map slot of a direct light. All the textures were made using 3D-Coat apart from the octopus skin.



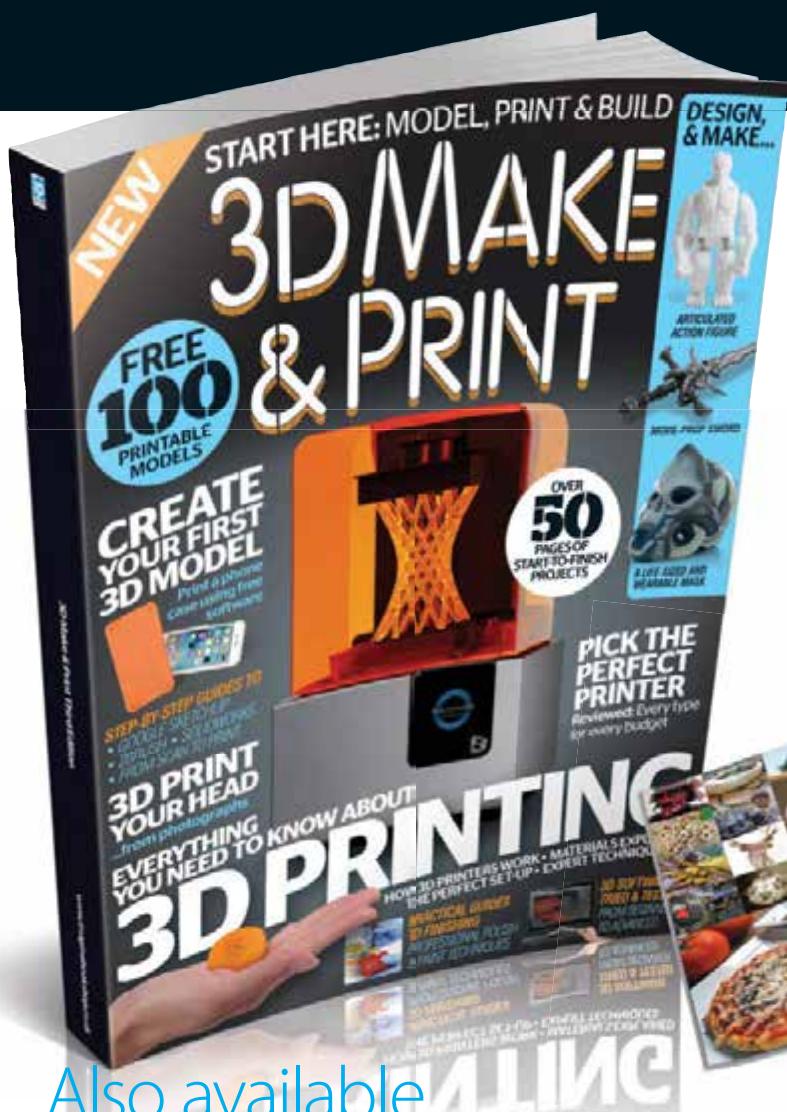
**Jose Klaus González Rohbrandt**  
[joseklaus.cgociety.org](http://joseklaus.cgociety.org)

Though Jose is not professionally linked to 3D design, it has always been his true passion

**Software** 3ds Max, V-Ray, 3D-Coat, ZBrush, Photoshop  
**Eight Reasons**, 2015



From the makers of **3DArtist**

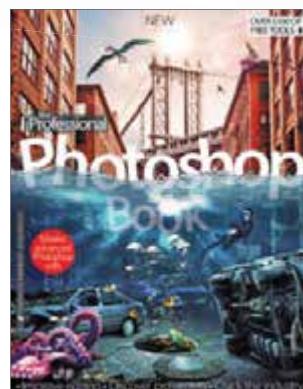
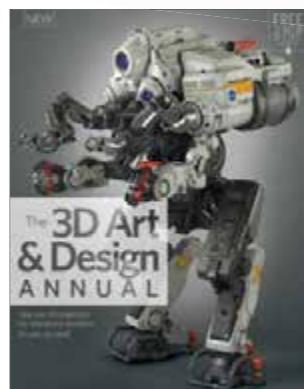
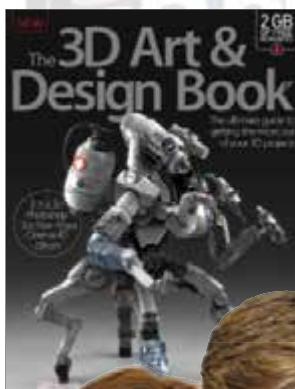


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# The Hub

The inside guide to industry news,  
VFX studios, expert opinions  
and the 3D community



**“**The ZBrush Summit gives a chance for artists to learn from professionals from various industries with on-site workshops. It's really a place for artists to share ideas and concepts **”**

**Paul Gaboury,**  
3D product and development manager, Pixologic

## 092 Community News **ZBrush Summit is back**

Pixologic's annual event kicks off for 2016 with an all-star cast of speakers and workshops

## 094 Industry News **Substance free for students**

Substance Painter and Designer is now free of charge for students and teachers, plus Unity 5.4 released

## 096 Social **Readers' Gallery**

The latest images created by the 3dartistonline.com community



# ZBrush Summit scores exclusive game dev content

**Pixologic's annual event is free and has plenty of special content to whet ZBrush appetites**

**T**his year's ZBrush Summit returns to Gnomon School in Hollywood, with talks from top studios such as Disney, Naughty Dog and Bethesda.

The event is now in its third year, and Paul Gaboury, 3D product and development manager at Pixologic, explains the success behind ZBrush Summit: "What makes the ZBrush Summit so successful is having a dynamic range of presenters from various industries."

These presenters also share exclusive work never before shared with the public. For example, in past years we've had clips from *Big Hero 6* before the movie was released and showings of the main characters from *Far Cry 4* before the game was out. This year, one of the things to look forward to will be behind-the-scenes [previews] of *Final Fantasy XV* the day it comes out and so much more. We strive to create an

atmosphere at the ZBrush Summit that is a place for artists to be inspired, discover and connect with the rest of the community. The ZBrush Summit also gives a chance for artists to learn from professionals from various industries with on-site workshops. It's really a place for artists to share ideas and concepts."

The event is free but workshops are allocated seats and tickets, with almost all of them sold out a month ahead of the 2016 Summit. On the bill are a diverse range of professionals and topics including 'Anatomy Of The Creature', which covers the principles of creating realistic creatures from id Software's Bryan Wynia, Denzil O'Neill and Jason Martin; kitbashing and key art techniques from Peter Konig; and hard-surface techniques from Bethesda's Dennis Mejillones and Lucas Hardi. Also presenting at

**“We strive to create an atmosphere at the ZBrush Summit that is a place for artists to be inspired, discover and connect with the rest of the community”**

**Paul Gaboury,  
3D product and  
development manager**

ZBrush Summit are Naughty Dog, showing off *Uncharted 4*, Blizzard exhibiting *Overwatch*, Oculus explaining how ZBrush fits into the pipeline, and Laika on its ten years of ZBrush use.

"All of that is just to name a few," exclaims Gaboury. "Last year was the first time we did a show at the Gnomon Gallery during the ZBrush Summit, which was a huge success. This year we will be following up with another Gnomon gallery show, but this time it will also contain augmented reality user interactivity. Visitors will be able to hold their phones up to the artwork and the models within the work will appear on their phones to get a closer look at the art."

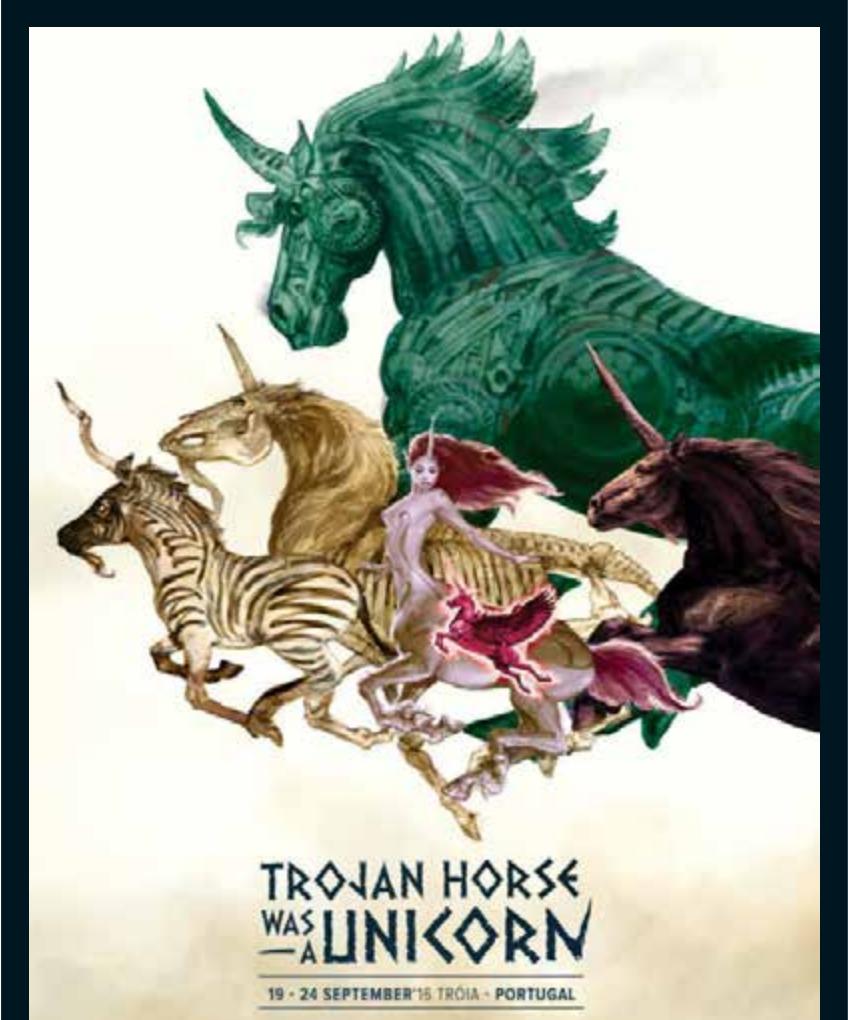
If you can't make the event then you can livestream the Summit directly to your smartphone or tablet. You'll be able to watch ZBrush demos, industry panels and more from the comfort of your own home with the Livestream app. Some of the guests from ZBrush Summit will also be joining Pixologic with fun gameplay videos with the launch of the official Pixologic Twitch channel. The hope is to share some behind-the-scenes access to artists developing games using the 'Let's Play' moniker. "Twitch is a fast growing community for artists to share their processes and workflows," explains Gaboury. "It's also a great place for the community to connect. We are hoping the Twitch community will be inspired to create their own artwork from what we share on our ZBrush Twitch channel. We are also looking into other avenues, such as podcasts, to allow artists access to the top industry professionals using ZBrush today."

This online strategy is only set to evolve for Pixologic and ZBrush Summit, with Gaboury commenting on the next steps: "We would like to continue to grow the three pillars of the ZBrush Summit: 'Inspire, Connect, Discover'. We would like to continue growing the ZBrush Summit viewership, both online and on site. In fact, we have several ideas that we hope to implement in future ZBrush Summit events. Our hope is that when people tune in online they will be inspired to join us in person the next year."

ZBrush Summit will take place from 30 September until 2 October at Gnomon School in Hollywood, USA.



The second annual ZBrush awards will also be taking place this year for artists nominated on ZBrush Central by fellow users



## THU unleashed for 2016

### Trojan Horse was a Unicorn is back for its fourth year

The beaches of Tróia, Portugal will once again play host to some of the best creative minds for Trojan Horse was a Unicorn 2016. Taking place from 19 to 24 September, the five-day event boasts close to 50 key speakers.

"This year, for the first time ever, we will have a creative space that will be completely ours," explains Andrew Luis, co-founder and director at THU. "A place where the Tribe can hang out, brainstorm, learn, create. The Gallery, which will be led by my friend and incredible artist Jeremy Mann, will be something really special... The late-night life drawing sessions that will take place in there are something I really want to see, especially since Alberto Mielgo, Jana Schirmer,

Nadezda, Phil Hale and Karla Ortiz will all be taking part. That's a lot of talent for one room."

Physical tickets are sold out for this year's THU, but you can catch all the action on THU TV with the purchase of a THU TV ticket. "At the end of the talks, which are broadcast live, there will be a slot reserved for THU TV users to ask questions and participate actively in the debate," continues Luis.

"However, the event only lasts one week. After, THU TV will keep providing its subscribers with inspirational, creative and entertaining high-quality content, made by artists for artists. THU TV allows THU to last the whole year round; to never end."

**Get in touch...**



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# Students get triple-A texturer for free

**Substance can be downloaded free for those in education**

Allegorithmic has made its Substance software set free under the For Education banner for all students and teachers. This means that those currently in or teaching education can use the same texturing tools that Naughty Dog utilised for *Uncharted 4* absolutely free of charge at home or on a personal workstation. "The fairness of our licensing models has always been at the heart of what we do,"

explains Allegorithmic's CEO and founder, Sébastien Deguy. "It started when we launched our Indie licences (a more affordable licence allowing commercial use for users earning less than \$100,000 a year, with no limits on features) and then Substance Live (a rent-to-own model for software).

"Up until now, students were under the Indie licence. This seemed fair to us at first, but we then realised that for them the barrier to entry was still too high (especially when their goal is simply to learn the software). Given the current number of paying licences that we have reached today, following three years of strong growth, we decided that the time was right for us to make personal licences free for students and teachers."

## More free Substance resources

Allegorithmic will be adding more free online tools for those looking to learn Substance with the release of the Substance Academy. The Academy will include tutorials, assets, videos and much more.

Those who are already subscribed to Substance Live will also receive high-quality assets from a huge database every month as well as the latest updates to each software.

The licence lasts for one year and is renewable – it will require proof in the form of a picture of an ID with the year, name and picture of the student or teacher on the card. Go to [www.allegorithmic.com/buy/download](http://www.allegorithmic.com/buy/download) to register now.

## Unity 5.4 released

**New version improves performance, lighting and VR support**

The latest Unity has finally been released with rendering and graphic improvements at the core. Having been in beta since December 2015, Unity 5.4 brings plenty of upgrades, including improved multithreaded rendering and frame rates – Unity 5.4 has introduced parallel command list generation to help with distributing work to multiple CPU cores. There will also now be fewer draw calls for rendering huge amounts of identical geometries with 5.4's instancing support.

Particles have been given new sizing controls for better management of 3D form, width and height. You'll also be able to tweak particle properties with the new trigger module.

Lighting has been enhanced, too, with the customisable Light Probe Proxy Volumes (LPPV). LPPV can be used on particles as well as larger, dynamic objects, and generate a interpolated light probe and 3D grid (the resolution of which can be set) inside a bounding volume to create a spatial gradient for probe-lit objects.

Multi-platform VR support has also been improved in Unity 5.4, with better support for OpenVR, Oculus Rift, Gear VR, PlayStation VR and Google's Daydream.



The short film 'Adam' was created using a demo version of Unity 5.4

**HAVE YOU HEARD?** 'Cosmos Laundromat' by Blender Institute has won the SIGGRAPH Jury's Choice Award!

# USD goes open source

## The 3D scene description tool from Pixar is finally released under the Apache licence

Pixar's Universal Scene Description is now open source. USD assembles 3D scenes with a more robust interchange of elemental assets, making composed scenes more understandable between software and applications. It organises these assets into 'prims' and layers, and overrides them non-destructively with only one API in a single scenegraph.

Universal Scene Description also has a set of schemas for standard encoding and client API, such as geometry, shading, and models and assets.

As the fourth-generation scene description composer from Pixar, Universal Scene Description has most recently been integrated into a movie pipeline for the first time in *Finding Dory*. For more information, head online to [www.graphics.pixar.com/usd/docs](http://www.graphics.pixar.com/usd/docs).



USD is used with Pixar's Presto animation software, as well as all animation and rendering applications

## London VFX apprenticeships

### Renowned studios collaborate on apprenticeships to bolster talent in Soho

Framestore, Double Negative, Lexhag, Jellyfish and The Mill have launched two two-year VFX apprenticeships. What's special is that all of these studios are based in London and the apprenticeships will be open to all EU citizens, provided they have A-Levels or equivalent, and are not planning on studying a degree. Amy Smith, Framestore's global head of recruitment, spearheads the campaign, which aims to diversify talent and enable a more accessible recruitment process. The two apprenticeships are junior 2D artist and assistant technical director, and will start from September 2016.

## Shotgun 7 released

### The production tool receives plenty of workflow streamliners

Shotgun has received a new iteration with a wide breadth of new features, including new editorial playback tools. The production manager has made reviewing work in the context of a cut easier, alongside the new Cuts tab in the Media app, which enables dragging and dropping EDL and MOV files. Any cut references for this file can then be viewed in its entirety anywhere. Cuts can also be viewed from anywhere, and review sessions are now more efficient as cuts can be accessed from the session. You can now publish information to Shotgun with the Import Cut app, too, with an informative summary of changes that you can then share with the rest of your team. Flame, Hiero/NUKE Studio and RV integration in Shotgun have all been improved, and they are now faster and more stable.



Many of Shotgun and RV 7's new tools are 'editorial aware', making workflows more efficient

## Software shorts



### 3DF Zephyr 2.7

3Dflow has released 3DF Zephyr 2.7, the tool for reconstructing 3D models from photos and videos. 3DF Zephyr can now be used as a 3D model viewer and frames can be extracted from MOV files. Point cloud stream rendering is also now available. 3DF Zephyr starts at \$199 for the Lite version. For more information, visit [www.3dflow.net](http://www.3dflow.net).



### Corel Painter 2017

The latest version of the illustration tool from Corel now has texture painting capabilities with the ability to import textures and materials. You can then paint these on with the new Texture Brush category. Concept artists can also now render a 3D model as a 2D bitmap in the latest iteration. Corel Painter 2017 is £315/\$429.



### Maxwell 4

Maxwell 4 now has a GPU render engine, materials gallery and a standalone application called Multilight. Multilight edits lights before and after the finished render and can create a useful catalogue for lighting that can be automatically updated with positions and geometry. Revit has also been revised in Maxwell 4 with the FIRE preview engine added.

Bringing you the lowdown on product updates and launches

**DID YOU KNOW?** The price of Houdini Education has dropped to \$75 annually for universities, colleges and training centres

## Images of the month

These are the 3D projects that have been awarded 'Image of the week' on [3DArtistOnline.com](http://3DArtistOnline.com) in the last month



**01** The Cliff Tower  
by **Pierrick Picaut**

3DA username

**Pierrick Picaut**

Pierrick Picaut says: "This is a picture done during the production of my latest Blender course. It is based on one of Corentin Chevanne's amazing concepts, which he kindly allowed me to use."

**We say:** There's a lot of mystery and character to this image and we love the painterly feel of the background. It looks like somewhere we'd like to live!



Image  
of the  
month



**02** East Field Bedroom  
by **Stefanie Chapman**  
3DA username  
**stefaniechapman**

Stefanie Chapman says: "My tools of choice were 3ds Max, V-Ray, Photoshop and Marvelous Designer for the bedding and the rug. I love the realism fabric simulations can add to any scene!"

**We say:** Stefanie is absolutely right - a decent fabric simulation can really elevate an arch-vis scene like this one. Great work!



**03** Human Eye  
by **Todor Nikolov**  
3DA username  
**ToshiCG**

Todor Nikolov says: "This is a human eye setup. I paid special attention to the notably complex area where the cornea, sclera and iris meet."

**We say:** Some people are a bit squeamish when it comes to eyes, but we think this is a great representation of one. This is a great example of subsurface scattering done right.



**04** Renaissance  
by **Joaquín Kierbel**  
3DA username  
**jkierbel**

Joaquín Kierbel says: "This is a concept piece I made in my spare time for a series of sci-fi images around the subject of transcodification. I used Blender and World Machine."

**We say:** This is a really interesting abstract piece from Joaquin and we think the choice of colours is spot on. The lighting here is lovely, too.





02



04



#### Dark Kitchen by Mehdi Abootalebi

3DA username **Mehdi Abootalebi**

**Mehdi Abootalebi** says: "Dark Kitchen is a series of three shots and I always like dark and black spaces because of the mysterious feeling that they conjure. So, I tried to achieve that feeling with my work this time."

**We say:** Mehdi's done a really nice job with the wooden floor texture, and it's offset nicely by the crisp, clean white cupboards on the right.



#### Jaguar by Daniele Boldi Cotti

3DA username **dboldicotti**

**Daniele Boldi Cotti** says: "This project was created using 3ds Max, KeyShot and NUKE. A close-up was the best photographic approach to represent the luxury of one of the most popular sporty cars."

**We say:** Stunning work as usual from Daniele, with the camera effects and particles in the foreground a particular highlight.



#### Jungle by Michael Johnson

3DA username **Cloudless**

**Michael Johnson** says: "Inspired by *The Jungle Book*, I wanted to create a forest environment that made you feel like you were actually in it. I added a character to give a sense of scale and to have sort of a story point, as if he was on a journey."

**We say:** Michael has created a really strong mood in this piece, and we can really see the *Jungle Book* influence.

# Technique focus

Incredible 3D artists take us behind their artwork

**MODELLING** In this project, I tried my best to express the typical fierceness of a lion by focusing on working on this model relatively quickly, rather than meticulously. Gathering good references for this sort of work is absolutely essential, as is a free and fluid work style.



Keita Okada

[yuzuki.artstation.com](http://yuzuki.artstation.com)

2D/3D concept artist, creature designer and a digital sculptor for triple-A videogames

**Software**

ZBrush, KeyShot, Photoshop

TurbulentLion, 2016





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